U. S. Government

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September 13, 1957
Vol. 28, No. 3

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In this issue:

Design Guide for the Retarding-Field Oscillator

Development and Evaluation of a Grease for —100° F. to 350° F.

Development of Thermally Stable Silicon Containing Resins

Effects of Rubber Compositions, Rubber Chemicals and Plasticizers upon Polyethylene

Evaluation of Fungicidal Treatments in Cotton Cargo Parachute Webbings

Ferroelectric Materials Survey

New Concept of Hydrogen Embrittlement in Steel

Second Survey of Domestic Digital Computing Systems

Ultrasonic Welding of Metals

Complete list of printed reports begins on page 133

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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

Vol. 28, No. 3 September 13, 1957

Contents

	Page
Bibliography	137
Cartography	137
Chemicals and Allied Products	137
Electrical Machinery	141
Food and Kindred Products	148
Fuels and Lubricants	148
Instruments	150
Metals and Metal Products	153
Meteorology and Climatology	158
Minerals and Mineral Products	159
Ordnance and Accessories	160
Packing and Packaging	161
Personnel Aptitude Testing	161
Photographic and Optical Goods	162
Physics	162
Physiology	169
Psychology	169
Rubber and Rubber Products	172
Structural Engineering	173
Textile and Textile Products	174
Transportation Equipment	174
Miscellaneous	179
Atomic Energy Commission Reports	180

Printed Reports Available from OTS Announced in This Issue

Airframe lubricants. (131203) 50 cents ..... Page 148

Analysis of dynamic creep considering strain rate effects. (PB 131256) 75 cents 153

Analysis of temperature coefficients of solubility in dilute liquid metal solutions. (PB 131065) 75 cents 153

Analytical methods for determining specific damping energy considering stress distribution. (PB 131250) $1.25 162-163

Application of ultrasonic energy to cold welding of metals. (PB 131083) $1.75 153

Axially symmetric mixing of two laminar incompressible streams, II. (PB 121230) $1.00 163

Body dimension changes during basic training. (PB 131183) $1.00 169

Corrosion of metals in tropical environments. Part I: Test methods used and results obtained for pure metals and a structural steel. (PB 121952) $1.25 153

Corrosive effects of protein-type foam-forming concentrates on common metals and dissimilar metal couples. (PB 131018) 75 cents 153

Page

Cutaneous toxicity evaluation of Air Force development materials. Part I. (PB 131199) $1.50 169

Descriptions of some current methods of determining creep properties under compressive, bearing and shear type of loading. (PB 131259) $1.00 154

Design guide for the retarding-field oscillator. (131201) $4.75 142

Determination of daytime conspicuity of transport aircraft. (PB 131122) 75 cents 174

Development and evaluation of a grease for -100°F. to + 350°F. (PB 131078) $1.00 149

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Differential effects of noise and fatigue on a complex counting task. (PB 121807) 75 cents 176

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Dynamic elastic properties of solids. (PB 121701) $3.00 163

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Effects of inelastic action on the resistance to various types of loads of ductile members made from various classes of metals. Part V: Inelastic behavior of aluminum alloy I-beams with elliptical web section cutouts. (PB 131245) $1.00 155

Effects of nuclear irradiation on magnetic properties of core materials. (PB 131014) $1.25 167

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Evaluation of five types of containers for jettisonable fiberglass fuel tanks. (PB 131187) 50 cents 161

Page

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Fire-retardant coatings. (PB 131002) $1.75 139

Handbook, field handling of concentrated hydrogen peroxide. (PB 131265) $3.25 140

Heat transfer in a laminar compressible boundary layer on a porous flat plate with variable fluid injection. (PB 131150) 50 cents 163

High perveance beams from arc cathodes. (PB 131212) $1.00 143

Improvement of echo suppression in DME transponders. (PB 131138) 50 cents 143

Industrial preparedness study for silicon power rectifiers. (PB 121547) $3.25 147

Intermittent stressing and heating tests of aircraft structural metals. (PB 131210) $2.00 156

Investigation of a new method for the determination of the coefficients of surface diffusion of metals. (PB 121956) $1.75 156

Investigation of condensation type elastomers. (PB 131178) $1.50 173

Investigation of X-radiation hazards, measurements, and shielding of high power RF transmitting tubes. (PB 121955) $1.00 168

Mean least turn and its relation to making settings on a linear scale. (PB 131197) $1.25 176

Measurement of radon gas in cylindrical ionization chambers. (PB 131186) 50 cents 168

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Modified blender cup for homogenizing small tissue samples. (PB 131207) 50 cents 150

New concept of hydrogen embrittlement in steel. (PB 131200) $1.25 157

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Physical properties of monolayers adsorbed at the solid/air interface. Part II: Mechanical durability of aliphatic polar compounds and effect of halogenation. (PB 131020) 50 cents 140

Page

PPI presentation of time-shared videos having synchronized or unsychronized antenna rotation rates. (PB 131137) 50 cents 145

Predictions of arrival sequences of simulated radar targets as a function of display size, target size, and target sharpness. (PB 131179) 50 cents 171

Preferred orientations and kinetics of recrystallization in titanium. (PB 121693) $2.00 157

Preparation and polymerization of perfluoroalkyl propenyl ketones. (PB 131055) 50 cents 138-139

Preparation and polymerization of some fluoroalkylmethylcyclosiloxanes. (PB 131205) 50 cents 173

Principles of inorganic polymerization. (PB 131180) $1.75 141

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Reusable seals for electronic equipment. (PB 131194) $2.50 145

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Simulation tests for Army air traffic control. (PB 131127) 75 cents 177

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Strength and corrosion resistance of ultrasonically soldered aluminum joints. (PB 121965) $1.75 158

Studies of quantitative methods for the separation and determination of zirconium and thorium in magnesium alloys. (PB 131244) $1.75 140

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Page

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BIBLIOGRAPHY

Literature survey on exposure testing of organic protective coating films, by B.G. Brand, E.R. Mueller and E.E. McSweeney. Battelle Memorial Institute, Columbus, O. Feb 1949. 61p. Order from LC. Mi $3.90, ph $10.80. PB 123741

This report presents a survey and bibliography of the technical literature dealing with accelerated and normal weathering tests of protective coating films during approximately the last twenty years. It is presented as a preface to a series of topical reports covering experimental work on the above subject, performed in connection with this project. The sources of the information presented in this report were: Chemical Abstracts, British Chemical Abstracts, and Engineering Review over the period 1926 to 1948, inclusive. AD 91633. Contract N5 ori-111, T.O. IV.

Review of past and current work on electro-osmotic stabilization of soils, by Leo Casagrande. Harvard University. Dec 1953. 114p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 124991

A literature review of the subject to 1953. Points to overduplicative efforts and need for more research. Soil mechanics series no. 45. AD 78479. Contract NOy-76303.

CARTOGRAPHY

Dystrip technique of color separation. U.S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Jun 1955. 15p drawings. Order from LC. Mi $2.40, ph $3.30. PB 124977

Dystrip is a strippable coating applied to a vinyl base which can be converted to a permanent type dyed image on vinyl. The base utilized is a precoated non-sensitized vinyl sheet. The technique described here is practical whenever a drawing is to be created utilizing line outlines as the margins of limitations within which color reproduction is established. Sample attached to back cover. AF ACIC TR 70.

Fotosetter type stick-up preparation, by E.D. Spaulding. U.S. Air Force. Aeronautical Chart and Information Center, St. Louis, Mo. Apr 1953. 5p. Order from LC. Mi $1.80, ph $1.80. PB 124796

A method of preparing transadhesive type stickup from film copy has been developed for use in conjunction with the Fotosetter Photographic Line Composing Machine. The new process has extended the use of the Fotosetter and has resulted in superior quality type stickup produced more economically. AF ACIC TR 25.

Lac strip technique of color separation. U.S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Jan 1955. 18p photos, fold tables. Order from LC. Mi $2.40, ph $3.30. PB 128368

In the preparation of tint separation drawings, the method of preparing gradient tints outlined herein utilizes a contour line image to delineate the individual tint areas and eliminates the difficulty of precise inking along the limits of each tint. Further study disclosed that certain opague coatings can be selectively removed by photomechanical processes of etching and solvent washing. Sample attached. Color will not reproduce. AF ACIC TR 62.

Photoscribe process, a method of producing scribe-coat negatives photomechanically. U.S. Air Force. Aeronautical Chart and Information Center. Air Photographic and Charting Service, St. Louis, Mo. Aug 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 128367

This report presents the results of successful investigations and experiments performed in preparing photomechanically etched, artificial scribecoat negatives. It is concluded that it is feasible from a production standpoint to prepare artificial scribecoat negatives from positive copy suitable for contact exposure, utilizing photomechanical means, holding specified limits regarding quality. Sample attached. Color will not reproduce. AF ACIC TR 74.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Effect of morphine-nalorphine mixtures on psychomotor performance, by Richard G. Pearson and Robert O. Bauer. U.S. Air Force School of

Aviation Medicine, Randolph Air Force Base, Texas. Jun 1956. 9p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 124976

Ninety-six subjects received preliminary training on a complicated compensatory pursuit task involving simulated aircraft instruments and controls, then continued work for four hours under conditions designed to appraise the side effects of certain opiate-antagonist treatments. Performance of the group given 8 mg. morphine was no poorer than that of the group given saline, while those groups given morphine-nalorphine mixtures exhibited much greater performance decrement. Performance was poorest for the group given 4 mg. of nalorphine alone. Nalorphine seemed to exert a soporific effect in direct proportion to the amount present in the treatment. AF SAM R55-137.

Organic Chemicals

Further studies of the cleavage of 3-alkoxypropionitriles with lithium aluminum hydride, by Louis M. Soffer, Manfred Katz and Elizabeth W. Parrotta. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1956. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 124978

Dept. of Army project: 5 B0302001. Ordnance Research and Development project: TB 3-0110. For earlier report see PB 118283. 1. Propionitriles, 3-Alkoxy - Derivatives 2. Lithium aluminum hydrides - Reactions 3. APG BRL R 992

Liquid density, vapor pressure and critical temperature and pressure of perchloryl fluoride, by Roger L. Jarry. Pennsylvania Salt Mfg. Co. Research and Development Dept. Whitemarsh Research Laboratories, Wyndmoor, Pa. Aug 1956. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 123952

1. Perchloryl fluoride - Density - Determination 2. Perchloryl fluoride - Vapor pressure 3. Contract AF 18(600)-761. AD 88971. To be presented at the fluorine symposium at the meeting of the American Chemical Society in Sep 1956. AF OSR TN 56-251.

Microwave spectrum and planarity of formamide, by R. J. Kurland. Harvard University. Mallinckrodt Chemical Laboratory, Cambridge, Mass. n.d. 5p table. Order from LC. Mi $1.80, ph $1.80. PB 124901

Study uses formamide as simplest C-N linkage of amides and polypeptides for drawing further conclusions as to understanding structural and intramolecular dynamics of such molecules. Date is 1955 or later. Contract N5 ori-76, T.O. 5.

Structures of the dialkyl phosphonates and some of their salts, by L. W. Daasch. U.S. Naval Research Laboratory. May 1957. 11p graphs. Order from LC. Mi $2.40, ph $3.30. PB 125429

Infrared spectra of several dialkyl phosphonates, $(RO)_2P(O)H$, their solutions in proton-accepting solvents, and the salts obtained by replacing the hydrogen in the phosphonate with a metal atom are presented for the 670 to 5000 cm^{-1} region. NRL R4945.

Plastics and Plasticizers

Development of thermally stable silicon containing resins, by L. W. Breed, Fred Baiocchi and Howard W. Christie. Midwest Research Institute, Kansas City, Mo. May 1957. 52p tables. Order from OTS. $1.50. PB 131190

This program includes the synthesis of silane monomers which contain two silicon atoms connected by arylene groups and have sufficient functionality to form a thermosetting polymer when hydrolyzed and cured. It also includes finding methods of hydrolyzing and polymerizing these monomers in which the maximum use is made of their functionality. Possible methods for synthesizing the monomers have been investigated. Also, the description of a statistically designed series of experiments to study the variables effective in the formation of laminates from silicone resins and glass fiber fabric is included. AD 118308. Project 7340, Task 73404. Covers work from 1 Apr 1956 - 1 Feb 1957. Appendix: Experimental design for study of laminating process. AF WADC TR 57-143.

Mechanical properties of 422-J Bacfoam core for sandwich construction, by P. M. Jenkinson and E. W. Kuenzi. U.S. Forest Products Laboratory, Madison, Wis. Apr 1957. 16p graphs, table. Order from OTS. 50 cents. PB 131077

This report presents the results of a few edgewise compression and flexure tests conducted at the U.S. Forest Products Laboratory on sandwich constructions of Boeing 422 J Bacfoam core with a density of 17 to 20 pounds per cubic foot and 2024-T3 clad aluminum facings 0.040 inch thick, and the results of flatwise compression tests on the core. Tests were conducted at room temperature, 200°, 300°, 400°, and 500°F. The test specimens and methods of testing are described. Test data are presented in tabular form and as curves illustrating the variation of mechanical properties with temperature. Typical stress-strain curves are included for flatwise compression of core at room temperature. AD 118249. Project 7340, Task 73402. Covers work from Aug-Dec 1956 under Contract AF 33(616)-56-9. AF WADC TR 57-132.

Preparation and polymerization of perfluoroalkyl propenyl ketones, by D. A. Rauch, L. E. Colema

and A.M. Lovelass. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1957. 14p tables. Order from OTS. 50 cents. PB 131055

A study of the preparation of α,β unsaturated ketones containing fluorine has been undertaken in this laboratory for use as monomers in the preparation of new and useful plastic and elastomeric materials for high temperature applications in military aircraft. The perfluoroalkyl propenyl ketones were found to copolymerize with a variety of vinyl monomers such as acrylonitrile, ethyl acrylate, styrene and vinyl acetate to give products ranging from powders to elastomers. AD 118158. Project 7340, Task 73404. Covers work from Sep 1955 - May 1956. AF WADC TR 56-492.

Research studies of plastic compounds for casting encapsulating and potting. United States Testing Co. Boston Research Division, Boston, Mass. Contract DA 36-039-sc-42459. Case no. 2263. Dept. of the Army project no. 3-93-00-503. Signal Corps project no. 32-2005-A. Order separate parts described below from LC, giving PB number of each part ordered.

First quarterly progress report, for the period 15 Jun through 14 Sep 1952, by Alfred K. MacKenzie and John J. Thornton. Oct 1952. 69p graphs, tables. Mi $3.90, ph $10.80. PB 126505

The objective of the contract is to develop synthetic resinous materials which can be used for the casting, encapsulating or potting of military electrical and electronic equipment. The work done in the first quarter is of a preliminary nature--definition of the problem, study of available information, obtaining required materials, setting up effective testing procedures, and initiation of the synthetic and casting aspects of the program. 92 castings were made involving various combinations of five commercial and three synthesized epoxy resins with one triamine and eight different anhydrides, two of which were synthesized. A test has been developed for the measurement of the second order transition point, or "softening point" of these resins. The object of the synthetic work was to prepare glycidyl ethers and curing agents which might increase the heat stability of epoxides by increasing cross-linking density.

Final report for the period 15 Jun 1952 through 14 Sep 1954, by Elizabeth A. Dearborn. Oct 1954. 43p graphs, tables. Mi $3.30, ph $7.80. PB 126799

Improved epoxy resins were developed and details are presented. Effort has been to develop materials with improved heat resistance over commercially available products, along with improvement in other characteristics.

Fire-retardant coatings, by Sam Collis. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Aug 1954. 62p graphs, table Order from OTS. $1.75. PB 131002

This project was undertaken in an effort to develop an insulative fire retardant coating suitable for use on aircraft. The desired coating should be a paint-like material, and when applied at a rate of not more than 12 pounds per 100 square feet on metal, should be able to provide a temperature differential of at least 1650°F. for a period of 30 minutes when subjected to a 2000°F. flame. In addition, the coating should have the usual properties of a good paint film. This report covers the initial screening of a number of materials to determine their performance under some of the conditions to which the coating might be subjected. A number of commercially available coatings were evaluated. No entirely satisfactory coating was developed or evaluated. Types or classes of materials deemed worthy of further investigation are noted. AF WADC TR 53-73.

Literature survey on exposure testing of organic protective coating films. See entry under heading Bibliography on page 137. PB 123741

Low visibility painting of lighter than air craft, by E.O. Hulburt. U.S. Naval Research Laboratory. Jun 1942. 12p photos, diagr , graph . Order from LC. Mi $2.40, ph $3.30. PB 120599

Unclassified 12 May 1955. 1. Paints, Aircraft - Tests 2. NRL H 1887

Oxidation-resistant coatings for molybdenum. Quarterly progress report no. 3 for the period 2 Apr - 1 Jul 1953 under Contract no. AF 33(038)-16197, by J.R. Blanchard. Climax Molybdenum Co., Detroit Mich. Jul 1953. 9p photos, tables. Order from LC. Mi $1.80, ph $1.80. PB 123584

During this period the following phases were investigated: 1. Simplification of coatings; 2. Evaluation of the capacties of sprayed coatings to sustain plastic deformation at 1800°F; 3. Gradient-temperature oxidation tests. For 1954-55 report see PB 111965.

Physical properties of monolayers adsorbed at the solid/air interface, by O. Levine and W.A. Zisman. U.S. Naval Research Laboratory. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Friction and wettability of aliphatic polar compounds and effect of halogenation. Jul 1957. 21p graphs, tables. 75 cents. PB 131013

Condensed monolayers of polar paraffinic compounds were adsorbed at the interface of polished glass and air. These films were prepared by retraction of the glass from solution, by retraction from the melt, and by a vapor-condensation method. The state of orientation and molecular packing of each monolayer was readily controlled and measured by the contact angle exhibited by methylene iodide. Measurements of the frictional force were made on a loaded stainless steel ball sliding at a uniform speed of 0.01cm/sec on the monolayer-covered glass plate. Homologous series of fatty acids, alcohols, primary amines, quaternary ammonium halides, perfluoroalkanoic acids, and telomers of tetrafluoroethlene, as well as a number of miscellaneous chlorinated acids were studied. These friction and wettability results were shown to be independent of the method used for isolating the condensed adsorbed films. Much evidence is given for concluding that the ability of a paraffinic derivative to adsorb as a solid monolayer is the result of considerable intermolecular cohesive energy between the paraffinic chains; dramatic examples of this effect are made evident by the substitution of fluorine, chlorine, and bromine for hydrogen. Finally, it is concluded that the transition from a solid to a liquid condensed-film takes place at lower values of N, the greater the energy of adhesion of the polar group to the glass substrate. NRL R 4943.

Part II: Mechanical durability of aliphatic polar compounds and effect of halogenation. Jun 1957. 19p graphs, tables. 50 cents. PB 131020

Mixed films of nonpolar solvent and primary amine (or fatty acid) molecules as well as single-component monolayers of aliphatic amino compounds, fatty acids, perfluoroalkanoic acids, telomers of tetrafluoroethylene, and chlorinated and ω-brominated alkanoic acids were studied. By correlating the frictional behavior of such films with their constitution and structure it was possible to set forth the requirements for a good physically adsorbed boundary lubricant. Film durability measurements readily distinguished between pure films and those containing solvent molecules. A mixed film between polar and solvent molecules was formed by the retraction method only when both were paraffinic. It occurred only in those instances where insufficient time had been allowed for the attainment of adsorption equilibrium. Such mixed films represent a transient or possibly a metastable state. It is concluded that the depletion of a boundary lubricating monolayer by a clean rubbing surface through a desorption-adsorption mechanism is an important factor in the mechanical failure of physically adsorbed films. In the presence of excess lubricant, the monolayer is regenerated. Finally, it is concluded that the measurement of film durability by the multiple traverse technique is a conveient and revealing method of studying the properties of adsorbed organic films. Portion of a thesis by O. Levine submitted to the Graduate School, Georgetown, University. NRL R 4946.

Inorganic Chemicals

Handbook, field handling of concentrated hydrogen peroxide, over 52 weight percent hydrogen peroxide. Revised. U.S. Bureau of Aeronautics. Jan 1957. 127p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.25. PB 131265

Formerly PB 120070. 1. Hydrogen peroxide - Handling 2. Hydrogen peroxide - Decomposition 3. Hydrogen peroxide - Storage 4. Hydrogen peroxide - Analysis 4. NAVAER 06-55-501

Analytical Chemistry

Physical chemistry of NaCl-KCl melts containing dissolved titanium chlorides. Final report, by Warren C. Kreye and others. Columbia University. School of Mines, New York, N.Y. Jun 1956. 49p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125907

The objective of this project was to study the equilibrium between titanium metal, $TiCl_3$ and $TiCl_2$ in the presence of NaCl-KCl melts. The desired equilibrium between titanium metal and dissolved titanium chlorides was established by addition of $TiCl_4$ to a salt melt in contact with excess metals. Two other equilibria were also studied: that between Ti^o and the NaCl-KCl melt alone; and that between $TiCl_4$ and the NaCl-KCl melt. In addition to the equilibrium studies, much of the work on the contact went into the development of procedures for the determination of Ti^{+2}, Ti^{+3}, Ti^{+4} in salt mixtures. The latter two equilibrium investigations and the analytical methods are described in the Appendices of this report. Main portion of report will appear in Aug issue of the Journal of the Electrochemical Society. Covers research from Feb 1, 1953 - Apr 30, 1956 under Contract Nonr-266(24)

Studies of quantitative methods for the separation and determination of zirconium and thorium in magnesium alloys, by B.A. Raby. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1957. 61p diagrs, graphs, tables. Order from OTS. $1.75. PB 131244

This paper describes the results of a comparative study of analytical methods suitable for the determination of thorium and zirconium in magnesium base alloys. In addition, this paper describes an

attempted amalgamation of selected analytical methods and ion exchange techniques into a scheme for the quantitative analysis of thorium and zirconium in these alloys. Manganese and zinc, common constituents of magnesium base alloys, were carried in the experiments, but only to study their interference in the proposed scheme. AD 130797. Project 7360, Task 73600. Covers work from Aug 1954 to Aug 1956. AF WADC TR 56-455.

Miscellaneous Chemicals

Principles of inorganic polymerization, by Anton B. Burg, Gottfried Brendel, Aimery P. Caron, Gordon L. Juvinall, Walter Mahler, Kurt Modritzer and Peter J. Slota, Jr. University of Southern California. Los Angeles, Calif. May 1957. 68p tables. Order from OTS. $1.75.
PB 131180

This project continues to seek and to find new patterns of chemical bonding and to consider their possible usefulness in relation to the invention of new polymers having unusual thermal stability. Some of our amino-phosphino-boron resins are stable at temperatures approaching 500°C., and the limit is not yet known; however the problem of their poor mechanical properties remains. The previous tentative interpretations of the by-products of the fluorocarbon-phosphorus iodide reactions with mercury are reconsidered in the light of new facts. Progress toward more electronegative substituents on boron is reported, and our recently initiated work on phosphino-aluminum compounds has produced some interesting materials. Nitrilophosphoric chloride is not depolymerized by pyridine, but it reacts with triethylamine in an interesting manner. AD 118301. Project 7340, Task 73404. Covers work from Feb 1956 - Jan 1957 under Contract AF 33(616)-2743. AF WADC TR 56-82, Part 2.

Research on surface properties of fine particles. Final report under Contract DA 36-039-sc-5411, by J.M. Dallavalle, Clyde Orr, Jr. and R.G. Blocker. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Apr 1953. 139p drawing, diagr, graphs, tables. Order from LC. Mi $6.90, ph $21.30.
PB 122862

This investigation, having as its general objective an evaluation of the surface properties of finely divided materials, has been concerned with the specific surface area, catalytic activity and heat of adsorption of powders. Four methods of evaluating surface area were investigated: the equilibrium adsorption of nitrogen gas at the temperature of liquid nitrogen, the liquid-phase adsorption of a straight-chained fatty acid, the adsorption of nitrogen gas at the temperature of liquid ntirogen and at conditions only approaching those of equilibrium and, finally, the rate of adsorption of nitrogen gas at the temperature of liquid nitrogen. Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152B-0. Project 181-119, Final report. For 1st-7th reports see PB 124021-124027.

Research on the size and shape of large molecules and colloidal particles, by A.F. Stevenson. Wayne University, Dept. of Chemistry, Detroit, Mich. Contract Nonr-736(000), NR 330-027. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 11. Jul 1955. 22p. Mi $2.70, ph $4.80. PB 124497

The theoretical treatment given in the present report is limited to rigid non-spherical particles and will therefore be primarily of interest for an exact determination of the size and shape of protein molecules. Contents: A: Theory of light scattering by spheriods. -B. On Krishnan's reciprocity relation in light scattering.

Technical report no. 12: Theory of the determination of size distribution in heterodisperse systems by light scattering. Part II. Jul 1955. 9p table. Mi $1.80, ph $1.80.
PB 124501

The present report concludes the first attempt begun in September 1953 (PB 117380) to derive equations for the determination of particle size distributions in heterodisperse systems containing spheres. In the present theory, not only turbidity measurements but also measurements at 90° are considered and no particular type of distribution curve is assumed. It is assumed, however, that the majority of particles have a diameter between 0.5 and 1.5 microns. For Part I see PB 117380.

ELECTRICAL MACHINERY

Communication Equipment

Ferroelectric materials survey with particular interest in their possible use at high temperatures, by Charles F. Pulvari. Catholic University of America. Electrical Engineering Dept. Washington, D.C. Feb 1957. 74p diagrs, graphs. Order from OTS. $2.00. PB 121949

This report is based on a survey of literature on ferroelectric materials with emphasis on those which might possibly be used at high temperatures. Data on high temperature properties were most carefully collected because of the increasing demand for high-temperature electronic components. Wherever crystallization conditions were known they also were briefly described. AD 110489. Project 7080, Task 70903. AF WADC TN 56-467.

Radio and the sunspot cycle, by L.C. Young and E.O. Hulburt. U.S. Naval Research Laboratory. Apr 1935. 11p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122762

1. Radio communication - Sunspot effects 2. Sun spots - Studies 3. Radio waves - Propagation - Theory. Parts of this report may not reproduce well. NRL H 1259.

Electronics

Adapter kit, camera to cathode ray tube indicator, MK-217 (XA)/APS-42. Final engineering report for the period 25 Jan 1954 - 18 Jun 1955 under Contract AF 33(600)-26696, by William L. Davis Mast Development Co., Inc., Davenport, Iowa. Jul 1955. 23p photos, drawings, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 124187

1. MK-217/APS-42 (Camera adapter kit) 2. APS-42 (Radar) 3. Adapters, Radar - Tests AD 70242

Basic research in electromagnetic theory. Final report under Contract no. AF 19(122)-42 for the period 1 Jan 1949 - 1 Sep 1956, by Morris Kline. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Sep 1956. 64p diagrs. Order from LC. Mi $3.90, ph $10.80. PB 124713

The research covers the subjects of diffraction theory, troposheric and ionospheric propagation, microwave optics, mathematical methodology, and some specialized results on antenna theory and wave guides. AD 98793. NYU RR EM 97 AF CRC TN 56-164

Controlled field emission in hexane, by W.B. Green Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Nov 1955. 18p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 124829

The current-voltage relationship for dielectric liquids consists of two portions, usually in superposition; at lower voltages a current of ions flows; at higher voltages, field emission sets in. The field emission current depends on the material of the cathode, but not simply on its work function. The current may be altered by changing the thickness of the cathode surface layer or the gas adsorbed upon the surface. When the ion content of the liquid is raised, not only the ionic current, but also the field-emission portion of the currents have been produced. MIT LIR TR 103.

Design guide for the retarding-field oscillator, by E. Milton Boone. Ohio State University Research Foundation. May 1957. 185p drawings, diagrs, graphs, tables. Order from CTS. $4.75. PB 131201

This design guide, as the name indicates, has been prepared to expedite the design for production of retarding-field oscillators operating over ranges of frequency that have been investigated at this laboratory. Dimensions, details of construction, and drawings of parts for the basic oscillator design have been included, along with brief discussions of operating principles and theory of the oscillator. Design details are provided on the Heil gun prototype and scaled versions of it. Analysis and design of the power-coupling system are presented. Details are given on resonator structure, and other parts of the standard oscillator design. A discussion of the frequency limitation is provided. Design data for specific frequency ranges with performance characteristics both at high and at low voltages are provided. The effect of design refinements of the coupling system and of the electron gun show the trend in oscillator performance as small changes are made. Laboratory measurements of noise characteristics show that the tube compares favorably with reflex klystrons operating at equivalent wavelengths. Construction techniques involving hobbing methods, brazing, and the preparation of cathodes prepared by compressing properly proportioned mixtures of nickel powder and the carbonates of barium and strontium have been described. It is shown that tubes with nickel matrix cathodes produce more power output at the same beam current than the same structures using oxide-coated cathodes. AD 130771. Project 4156, Task 41688. AF WADC TR 56-562.

Development of noise-figure measuring equipment and power and SWR monitors. Final report under Contract no. AF 19(604)-1173, by H. Laskin. Airborne Instruments Laboratory, Mineola, N.Y. Jul 1956. 89p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 124712

The purpose of the work performed under this contract was to develop an experimental-model Radar Performance Monitor that would be capable of continuously monitoring system performance, as indicated by the parameters of receiver noise figure, transmitted power, and transmission-line SWR. The monitor is ultimately intended to be part of an unattended radar system. In the event of radar failure, the monitor will provide information (the closing of a set of contacts) to the radar control circuits to initiate automatic radar channel transfer to a second standby radar equipment. Some of the specific items that were accomplished under this contract are the design of a practicable noise-figure monitor, two practicable methods for continuous monitoring of SWR, and the design of a directional coupler assembly for use with the noise-figure, power, and SWR monitors. Report 3245-1. Appendix: Difference in normalization methods. AF CRC TR 56-176.

Development of the ultra-high-frequency radio range. Part III: A visual-aural ultra-high-frequency radio range with simultaneous voice. U.S. Civil Aeronautics Administration. Technical Development Center, Washington, D.C. Jun 1945. 117p photos, diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 127860

For Parts 1-2 see PB 123549aand 122281. 1. Radio range (UHF) 2. Radio range (UHF) - Components 3 CAA T DR 49

Effects of impurities on the resonator and lattice properties of quartz, by D.L. Hammond, A.R. Chi and J.M. Stanley. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Nov 1955. 24p photo, graphs, tables. Order from OTS. 75 cents. PB 131087

Studies of the synthesis of quartz crystals from solutions containing impurities have shown that the impurities aluminum, germanium, lead, tin and silver can be incorporated in the crystal lattice in concentrations much larger than the concentrations of the same impurities commonly found in natural quartz. The presence of some impurities in the solution also appears to influence the growth rate. The presence of impurities in quartz resonators induces an appreciable change in their frequency temperature behavior. In the case of the impurity aluminum, the AT frequency-temperature characteristic is shifted upward in frequency as much as 50° C. This change may be beneficial in the application of quartz to frequency control problems over elevated temperature ranges. D.A. proj. nr. 3-99-11-000. Signal Corps task nr. 142A. SCEL ER 1162.

Effects of thin resistive coatings on low-frequency aircraft antenna performance, by Charles W. Steele. Stanford Research Institute, Menlo Park, Calif. Jan 1956. 112p photo, drawing, diagrs, graphs, table. Order from LC. Mi $6.00, ph $18.30. PB 125073

This report presents the results of a study of the performance of low-frequency aircraft antennas having dielectric parts covered with thin resistive coatings. Such resistive coatings are currently being used to reduce the precipitation static interference which results from the charging of these dielectric surfaces. Contract AF 19(604)-1296. AF CRC TN 56-354. SRI TR 39. SRI Proj 1197.

Elevation controller for CAPI operation of the AN/CPS-9 weather radar, by T.W.R. East. McGill University. MacDonald Physics Laboratory. Oct 1956. 20p diagrs, tables (1 fold). Order from LC. Mi $2.40, ph $3.30. PB 124717

1. CAPI (Constant-altitude plan indicator) 2. AN CPS-9 (Radar) 3. Radar, Meteorological - Components - Canada 4. Radar equipment - Operation - Canada 5. Antennas, Radar - Elevation control equipment - Canada 6. Contract AF 19(604)-1579 7. MW T 2 8. AF CRC TN 56-698. AD 98725

Excitation of surface waves, by B. Friedman and W. Elwyn Williams. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Oct 1956. 29p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 125096

It is shown how to locate a dipole source above a dielectric surface so as to either (a) produce as pure a surface wave as possible or (b) maximize the amount of the energy carried by the surface wave. AD 110139. Contract AF 19(604)-1717. NYU RR EM-99. AF CRC TN 56-798.

External power monitoring of the model DTB DME transponder, by Ronald M. Fisher and A.W. Randall. U.S. Civil Aeronautic Administration. Technical Development Center, Indianapolis, Ind. May 1957. 10p drawings, diagrs, graphs. Order from OTS. 50 cents. PB 131102

This report describes a modification of the Model DTB distance-measuring equipment which assures a postive examination of the radiated power output and characteristics of the emitted signal. As opposed to the existing monitor wherein the output power is sampled in the radio-frequency transmission line circuit, the new monitor samples radiated power. Operational use of the Model DTB equipment has shown that the present monitor system does not adequately detect power-output variations of the reply signal. In this report another modification is outlined which improves the linearity and stability of the monitor power-detector circuitry and provides a less critical adjustment of the monitor power-threshold control. CAA TDR 306.

High perveance beams from arc cathodes, by Charles W. Hartman. California. University, Berkeley, Calif. May 1957. 37p diagrs, graphs, table. Order from OTS. $1.00. PB 131212

Experiments directed toward extracting high voltage electron beams from D.C. and pulsed arc plasmas are described. A mercury arc plasma was used for D.C. extraction with the necessary high vacuum near the plasma obtained by refrigeration. Extraction from pulsed arcs was accomplished prior to appreciable expansion of the local arc vapor. Confinement of the beams produced and high voltage breakdown were the main difficulties encountered. A cure for both problems is felt to be a highly convergent, strong magnetic field in the arc cathode region. AD 118298. Project 4156, Task 41560. Contract AF 33(616)-3278. AF WADC TR 57-238.

Improvement of echo suppression in DME transponders, by A.W. Randall and Roger L. Williams. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Jun 1957. 9p diagrs, graphs. Order from OTS. 50 cents. PB 131138

Experience gained through the use of ground and

airborne distance-measuring equipment has indicated that air/ground path echo signals can be responsible for occasional loss or erratic indications of distance information when the interrogator and transponder equipments are operating properly and when it is known that interrogation and reply signals are being received. This report describes the manner in which interrogation-path echo signals affect the performance of the transponder, and it indicates modifications which may be made to DME transponders to eliminate the ill effects of echo signals. The techniques have been applied to the model DTB transponders employing paired pulses. CAA TD R309.

Interference between VHF navigation receivers, by David S. Crippen and W.L. Seibert. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1953. 6p diagrs, tables. Order from LC. Mi $1.80, ph $1.80. PB 127855

1. Radio receivers (VHF) - Interference 2. CAA TDR 132

Investigation of electrolysis of water, by Paul Hausmeister. Translated by Otto Mendle. U.S. Naval Research Laboratory. Aug 1935. 34p photos, drawing, diagr, graph, table. Order from LC. Mi $3.00, ph $6.30. PB 122657

First partial report. Part of the text in German. Parts of this report may not reproduce well.
1. Electrolysis - Theory - Germany 2. Electrolytic cells, Hydrogen-oxygen - Tests - Germany 3. NRL M 1128

Laboratory tests of VOR signal interference ratios, by Raymond A. Forcier and W.L. Seibert. U.S. Cival Aeronautics Administration. Techical Development and Evaluation Center, Indianapolis, Ind. Mar 1953. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 127859

1. Radio interference - Tests 2. VOR (VHF omnidirectional radio range) 3. CAA TDR 154

Measurement of VOR polarization errors, by Sterling R. Anderson and Wendell A. Law. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1953. 14p photos, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 127847

1. Antennas, Omnidirectional - Radiation patterns 2. Radioranges - Performance 3. VOR (VHF omnidirectional radio range) 4. CAA TDR 202

Mountain-top VOR site flight tests, by Thomas S. Wonnell. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1951. 15p photos, table, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127857

1. VOR (VHF omni-directional radio range) 2. Radio ranges - Performance 3. Radio ranges - Location 4. CAA TDR 139

Omnidirectional airplane antenna study (Phase III), by W. Spanos. Federal Telecommunication Laboratories, Inc., Nutley, N.J. Mar 1956. 123p photos, drawings, diagrs, graphs. Order from LC. Mi $6.30, ph $19.80. PB 124939

The work of Phase III concerns primarily the construction and testing of a working model of the nose and tail system. An experimental 960-1215-mc nose and tail antenna system was built for a DC-3. Each antenna covered a 180° sector in azimuth and a -15° sector elevation. A microstrip hybrid (r-f bridge) was included as part of the system to permit simultaneous operation of the distance measuring and the radar safety beacon equipment. Contract Noa(s) - 12212, Final report.

Omnirange receiver test system, by Raymond E. McCormick, Kennard F. Voyles and Blanchard H. Boyle. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1952. 6p photo, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127841

1. Radio receivers - Calibration 2. Radio ranges - Tests 3. Goniometers - Uses 4. CAA TDR 162

On a self-consitent field method for a completely ionized gas, by E.G. Harris. U.S. Naval Research Laboratory. May 1957. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 125388

The state of a plasma is described by phase-space distribution functions for the electrons and ions. A derivation of this set of equations based on Liouville's theorem is presented. A class of time-independent problems is considered in which the set of equations may be reduced to two or three coupled ordinary differential equations. The method is applied to problems of the confinement of a plasma by a magnetic field, the pinch effect, and nonlinear plasma oscillations. NRL R 4944.

1/f noise and related surface effects in germanium, by Alan L. McWhorter. Massachusetts Institute of Technology. Research Laboratory of Electronics, and Lincoln Laboratory, Cambridge, Mass. May 1955. 118p diagr, graphs, table. Order from LC. Mi $6.00, ph $18.30. PB 125024

Identical with a thesis - Massachusetts Institute of Technology. 1. Germanium - Resonance levels 2. Germanium - Surface properties 3. Germani-

um - Conductivity 4. Noise - Intensity spectra - Theory 5. MIT LL TR 80 6. MIT RLE TR 295

Polarization errors of two different omnirange antenna arrays, by S.R. Anderson and H.F. Keary. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1950. 12p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127851

1. Antennas, Omnidirectional - Radiation patterns 2. Radio ranges - Performance 3. CAA TDR 63

PPI presentation of time-shared videos having synchronized or unsychronized antenna rotation rates, by William E. Miller and Lawrence B. Ii. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Jun 1957. 7p. Order from OTS. 50 cents. PB 131137

A Navy type SPA-8A radar plan-position indicator was modified to display two synchronized radar-video inputs on a time-shared basis. A characteristic of these radar inputs was that they possessed common or synchronized triggers and either synchronized antenna rotation with fixed azimuth displacement or unsynchronized antenna rotation. This report outlines two applications for this type of indicator and the modification and factors to be considered when time-sharing. Prepared for the Air Navigation Development Board under project no. 1.4. CAA TDR 290.

Printed wiring techniques, by Michael P. Forte and Harvey Shapiro. U.S. Air Force. Air Research and Development Command. Rome Air Development Center. Griffiss Air Force Base, Rome, N.Y. Jun 1956. 46p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124505

This report reviews the present state-of-the-art with emphasis on printed wire manufacturing processes, printed wire board materials, and design considerations of printed wiring such as the use of double sided laminates and assembly techniques. Information regarding the capabilities and limitations of printed wiring is presented plus a description of the RADC printed wiring facility. Benefits that can accrue from the use of various printed wiring techniques are also given. Project: 45290. AF RADC TN 56-198.

Qualitative study of energy bands in gallium arsenide, by Joseph Callaway. Chicago. University. Chicago Midway Laboratories, Chicago, Ill. Sep 1956. 21p diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 124155

An attempt is made to relate energy bands in gallium arsenide to those in germanium through the use of second order perturbation theory. The perturbing potential is obtained from self-consistent field calculations for neutral gallium, germanium, and arsenic atoms. AD 96223. CML-56-TN-P108-5. AF OSR TN 56-414.

Quarterly progress report under Contract no. N7 onr-29529 for the period 1 Oct to 31 Dec 1955. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jan 1956. 27p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 124695

This report covers work done during this period under Contract N7-onr-29529 and under the Boeing Airplane Co. research grant, and includes most of the University-sponsored research which is being actively pursued. It includes: Scattering from a prolate spheroid, Diffraction by cylindrical reflectors, Large slots in rectangular waveguide, Multidimensional arrays, Ferrites in broadband microwave systems, Broadband transmission in waveguides, Microwave radiometry, etc., and lists reports issued and under preparation. For other quarterly reports see PB 118246, 119194, 117511, 123153 and 123424. UC IER Series 60, Issue no. 11.

Report on electronic systems of air navigation. Chapter 10: TACAN. U.S. Dept. of Commerce. Air Coordinating Committee. Air Traffic Control and Navigation Panel. Apr 1957. 10p graphs. Order from OTS. 50 cents. PB 111344s

Supplement to PB 111344. 1. Navigation, Aerial 2. Navigational aids 3. TACAN (Tactical Air Navigation System)

Reusable seals for electronic equipment, by William Brown and A. Razdow. General Hermetic Corp., Valley Stream, N.Y. May 1957. 94p photos, drawings, diagrs, graphs, table. Order from OTS. $2.50. PB 131194

This report covers the investigation, evaluation and establishment of the most effective type of reusable seals for airborne electronic equipment. Fused seals, methods and procedures were developed for hermetically sealed enclosures of electronic assemblies, subassemblies, and equipment, so they can be opened fifteen times for repair and resealed without destroying the contents there-in. The methods developed are satisfactory for field service application. Temperature measurement techniques were worked out in order to determine the exact heat distribution in and on the seal. As a result of comparative measurements, the best possible seal joint, the most appropriate metal for the cans, and the most efficient heat transfer method was determined. A heat reflecting baffle was developed which decreases the temperature inside the sealed enclosure to below 85°C. The comparative tests on heat transfer methods showed very promising results with the electrical band heater. AD 130772. Project 4526, Task 41602. Summarizes research from Jun 1, 1955-

Oct 31, 1956 under Contract AF 33(616)-2994. AF WADC TR 56-616.

Survey of the airways and air communication service electronics maintenance system, by Paul Spector. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1955. 28p Order from LC. Mi $2.70, ph $4.80. PB 124734

Findings are presented of a field survey of the new Airways and Air Communications Service maintenance system. With each finding is presented a brief analysis where appropriate and a recommendation for alleviating difficulties found. Recommendations are made for a strong OJT program, for modifications to present maintenance guides, procedures, and equipment, and for studies to determine (a) what are minimum routine maintenance requirements, (b) what are the practical maintenance data needs of the command, and (c) what is the optimal content and form of checklist-type maintenance guides. AD 78432. Contract AF 30(602)-24. AF RADC TN 55-388.

Sythesis and realization of crystal filters, by David I. Kosowsky. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jun 1955. 62p diagrs, graphs graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 124248

A new technique has been developed for the synthesis and realization of bandpass filters employing quartz resonators. By the use of approximation methods, crystal filter design is simplified to the point at which synthesis may be accomplished with only a slide rule and a number of plotted curves. The problem of obtaining piezoelectric resonators adjusted to extremely close tolerance was solved by the development of a new crystal-measuring procedure. Several crystal filters were constructed, and an excellent correspondence was found between calculated and measured characteristics. Project 102B. Dept. of the Army project 3-99-10-022. Based on a thesis submitted to the Dept. of Electrical Engineering. Contract DA 36-039-sc-42607. MIT RLE TR 298.

Test of Kearfott Direction Finder, by J.C. Link. U.S. Naval Research Laboratory. Apr 1936. 33p tables. Order from LC. Mi $3.00, ph $6.30. PB 122745

1. AS-101 (Radio direction finder) 2. Radio direction finders - Tests 3. NRL R 1263

Theoretical analysis of flat radome panels utilizing circular and elliptical polarization, by Robert E. Webster. Ohio State Research Foundation, Columbus, O. May 1957. 11p. Order from OTS. 50 cents. PB 131206

The factors contributing to polarization-dependent radome errors are stated. The present investigation to illustrate and eliminate the effects of these factors is then outlined. Reference is made to technical reports which contain the detailed analyses and conclusions summarized briefly herein. AD 130773. Project 4158, Task 41731. Contract AF 33(616)-3277. AD WADC TR 57-90.

Thermodynamic potential functions for anisotropic materials, by G.F. Smith and R.S. Rivlin. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Dept. of the Army project no. 599-01-004. Ordnance R&D project no TB 2-0001. OOR project no. 1271: Application of invariance principles in continuum mechanics. Order separate parts described below from LC, giving PB number of each part ordered.

Part II: The electromagnetic potential function for the crystal systems (Triclinic, monoclinic, rhombic and tetragonal systems). Mar 1956. 76p. Mi $4.50, ph $12.30. PB 125529

The electromechanical potential function is seen to be a polynomial in the components of a symmetric tensor and a vector. Corresponding to each crystal class, there exists a polynomial basis for the set of polynomials which are form invariant under the group of transformations associated with the crystal class. A polynomial basis if found for each of the crystal classes belonging to the triclinic, monoclinic, rhombic and tetragonal crystal systems. GDAM DA 3487/4. GDAM TR 4.

Part III: The electromagnetic potential function for the crystal systems. (The cubic system). Mar 1956. 90p. Mi $4.80, ph $13.80. PB 125532

Corresponding to each crystal class, there exists a polynomial basis for the set of polynomials which are form-invariant under the group of transformations associated with the crystal class. A polynomial basis is found for each of the crystal classes belonging to the cubic crystal system. GDAM DA 3487/7. GDAM TR 7.

Thermodynamic properties of technetium and rhenium compunds. VI: Potential of the ReO_3/ReO_4^- electrode and the thermodynamics of rhenium trioxide, by J.P. King and J.W. Cobble. Purdue University. Dept. of Chemistry, Lafayette, Ind. Jul 1956. 16p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 124141

The potential of the ReO_3/ReO_4 electrode has been measured over a wide range of concentration and pH. The cell was demonstrated to be satisfactorily reversible by the close agreement of the standard potential calculated from measurements in both acidic and basic solutions, as well as from the reasonable entropy values obtained from a determination

of the temperature coefficient. AD 95435. AF OSR Chem. 30-99. Contract AF 18(600)-1525. AF OSR TN 56-349.

Turbulent mixing theory applied to radio scattering, by Richard A. Silverman. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Jan 1956. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 123409

Obukhoff's statistical theory of turbulent mixing is proposed as replacement for the heuristic theories of Gallet and Villars-Weisskopf, and is applied to the problem of the scattering of radio waves by refractive index fluctuations. In the case of ionospheric scattering, order-of-magnitude agreement with the observed scattered power is obtained if the refractive index fluctuations are attributed to electron density fluctuations produced by turbulent mixing in the lower edge of the E-layer. In the case of tropospheric scattering, it appears that order-of-magnitude agreement with the observed scattered power can be obtained, except during the summer months, by attributing the refractive index fluctuations to temperature fluctuations. During the summer months and at low scattering heights, humidity and its fluctuations are expected to play a prominent role. Experimental and theoretical evidence is cited in favor of perennial fractional-degree temperature fluctuations in the troposphere. Comparison of the Obukhoff, Villars-Weisskopf, and Booker-Gordon models is given. Contract AF 19(122)-42. NYU RR EM-88. AF CRC TN 56-169.

VHF omnirange reflections from a single tree, by Robert B. Flint and Arthur E. Frederick. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Jun 1957. 11p photos, diagrs, maps, graphs. Order from OTS. 50 cents. PB 131136

The proper siting of a very-high-frequency omnirange (VOR) station is complicated by the many reflecting objects such as trees, wires, buildings, and fences which may cause adverse effects on the courses. The effects of reflections from wires and hangers have been discussed in previous reports. It has long been recognized that trees cause course scalloping. It was not known, however, if a particular part of a tree, such as the foliage, the horizontal limbs, or the trunk was the major cause of course scalloping. This report describes some flight tests to determine the effects of a single tree on scalloping of VOR courses. The spacing between the VOR station and the tree was limited to 400 feet in order to facilitate the differentiation of the single tree scalloping from the residual scalloping. The tests were conducted during February and March 1956 while the tree had no leaves. CAA TDR 314.

Vibration and shock evaluation of airborne electronic component parts and equipment, by Robert H. Jacobson. Armour Research Foundation, Chicago, Ill. Dec 1956. 206p photos, diagrs, graphs, tables. Order from OTS. $5.50. PB 121937

In a program to determine the ability of airborne electronic component parts and equipments to withstand severe environmental conditions, the effects of vibration, shock, and acoustic excitation were investigated. Six categories of component parts - relays, tubes, potentiometers, transformers, capacitors, and pressure switches - were subjected to vibration tests: three of the categories were subjected to shock tests; and three categories were subjected to acoustic tests. Eight models (32 samples) of electronic equipment were subjected to vibration and shock tests. The report also includes vibration magnification data, measured at different locations on several of the equipments investigated. Numerous suggestions, pertaining to modification of the construction or application of component parts to increase vibration and shock resistance are contained in the report. Project 4157, Task 41612. Covers research program from 1 Jul 1952 through 30 Sep 1955 under Contract AF 33(616)-223. AF WADC TR 56-301.

Generators, Motors, Transmission

Industrial preparedness study for silicon power rectifiers. Final report covering the period Jul 1, 1954 - Jan 1, 1956 under Contract no. DA 36-039-sc-46638, by D. Bakalar, H.G. Rudenberg, D. Navon and T. Clark. Transitron Electronic Corp., Melrose, Mass. Apr 1956. 128p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.25. PB 121547

The object of this study is to: 1. Engineer a high-temperature, hermetically-sealed silicon rectifier, capable of handling alternating current with high efficiency. 2. Set up applicable military specifications for the silicon power rectifiers in cooperation with the Signal Corps Engineering Laboratories. 3. Supply prototype and approval samples. 4. Establish production techniques and design and construct automatic and semi-automatic machinery for manufacturing silicon power rectifiers. 5. Supply production samples from an unbalanced pilot line. For quarterly reports July 1954 - Jul 1955, see PB 117641-117642, 111819, 120305.

Static high frequency generator and magnetic amplifier, by Max Frank and James R. Walker. Wayne University. Wayne Engineering Research Institute, Detroit, Mich. Feb 1957. 202p diagrs, graphs, tables. Order from OTS. $5.50. PB 131240

Early developments in the field of static frequency multipliers are described and the theoretical contributions of these early workers have been extended to include the use of high permeability, square loop core material which has become commercially available since the early work was instituted. A theoretical analysis of both the shunt and series-fed shock

circuits is included in conjunction with appropriate inferences with regard to incident circuit function. A description of series-type shock circuit development and surrounding difficulties is included. Data is given concerning a final engineering model incorporating principles established during earlier work. A second portion of the basic work devoted to static multipliers was concerned with an investigation of switching circuits employing a combination of transistors and magnetic cores. Both theoretical and experimental data on these, as well as a finally chosen parallel switching-shunt reactance type multiplier, are presented and discussed. Development of appropriate magnetic amplifiers for use with the Moog hydraulic valve which are capable of being operated with each type of multiplier is discussed and experimental data obtained from these amplifiers is presented. AD 110698. Project no. 1385, Task no. 50353. Covers the period from 25 Feb 1956 to 25 Jan 1957 under Contract AF 33(616)-3511. AF WADC TR 57-12.

Miscellaneous

Development of high rate non-reserve mercuric oxide cells: third and final report, for the period May 1, 1956 - Jun 30, 1956, by Cecil Jenkins. General Dry Batteries Co., (Div. of P.R. Mallory & Co.), Cleveland, O. Jun 1956. 38p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 128097

Object of this project is the creation of complete specifications for a high rate, light weight, non-reserve "A" and /or "B" battery for one shot applications utilizing the zinc, mercuric-oxide, potassium hydroxide systems. Dept. of the Army project: 3-18-03-043. Signal Corps project: 2024C.

Flux reversal in a supermalloy core by constant-current pulses, by W.H. Lucke. U.S. Naval Research Laboratory. Jun 1957. 25p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 124929

An apparatus was designed and built to apply constant-current pulses of preset amplitude and length at a rate of 60 per second to a magnetic core. Each of these pulses was followed by a constant-voltage pulse to measure the resulting change in flux level and to reset the core for the next current pulse. Data were taken on a toroidal Supermalloy core built up from 2-mil tape. A qualitative theory explains the dependence of instantaneous rate of flux change on the square of the applied field. Further work is necessary, however, to explain why the maximum rate of flux change occurs at 50% of total flux reversal. NRL R 4896.

FOOD AND KINDRED PRODUCTS

Relation of surface activity to the safety of surfactants in foods. National Research Council. Division of Biology and Agriculture. Food and Nutrition Board. Food Protection Committee. Oct 1956. 12p. Order as Publication 463 from NAS-NRC, Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. Free. PB 124700

1. Surface active agents - Toxicity 2. Food - Bacteriology 3. Detergents - Toxicity 4. NRC 463.

FUELS AND LUBRICANTS

Airframe lubricants. Coordinating Research Council, Inc., New York, N.Y. May 1957. 20p table. Order from OTS. 50 cents. PB 131203

This report, covering seven projects in all (high temperature testing of greases in antifriction bearings, fretting corrosion, rust-prevention properties of greases, plain-bearings, screw thread and gear mechanisms, bonded solid-film lubricating coatings, and methods for cleaning bearings prior to use in laboratory tests), describes the scope and objective of each project, the work of the Laboratory and Service Evaluation Panels for each, the conclusions reached, and the plans under consideration for future work along the same lines. AD 118277. Project 3044, Task 73312. Covers work from Jun 1954 to Dec 1956 under Contract AF 33(616)-2888. AF WADC TR 57-36, Part I.

Atmospheric distillation of the "A" series of fuel oils and the analysis of the fractions, by R.D. Norton and P. Borgstrom. U.S. Naval Research Laboratory. Apr 1935. 26p diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 122805

Parts of this report may not reproduce well. 1. Oil fuel - Distillation - Methods 2. NRL P 1150

Calculation of reaction rate parameters from flame speed data on laminar flames, I, by E. Mayer and H. Carus. Arde Associates, Newark, N.J. Jul 1956. 29p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 125075

In the analysis of many technical combustion problems the rate controlling step is assumed to be given by a phenomenological reaction rate law of the Arrhenius type: The Arrhenius parameters may be determined by comparison of experimental flame speed data with calculated data based on the assumed form of the reaction rate law. In this memorandum a numerical procedure is described for the calculation of laminar flame speeds based on the Arrhenius law.

Chem 50-16. Technical note 4555-2. AD 89496. OSR TN 56-286.

Development and evaluation of a grease for -100°F., by Ernest W. Nelson, Warren W. Woods and William P. Scott. Continental Oil Company, Houston, Texas. Apr 1957. 32p diagrs, graphs, tables. Order from OTS. $1.00. PB 131078

In the work directed toward the development of an aircraft grease suitable for use over a wide temperature range, emphasis has been placed on the utilization of certain hexa alkoxy fluids as base oils. The thickener was limited to colloidal calcium carbonate coated through chemical interaction with the calcium salt of 3-methyl glutaric acid. Formulations using the base oil hexa (2-ethyl butoxy) disiloxane show promise of utility over a -100°F. to +325°F. temperature range. Formulations using the base oil hexa (2-ethyl hexoxy) disiloxane show promise of utility over -100°F. to +350°F.) AD 118236. Project 3044, Task 73310. Covers work from Dec 1955 - Dec 1956. AF WADC TR 55-190, Part 3.

Emulsion formation of the "A" series of fuel oils, by O.I. Lewis and P. Borgstrom. U.S. Naval Research Laboratory. Jun 1935. 40p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 122665

1. Oil fuel - Stability 2. Emulsions - Stability 3. Oil fuel - Analysis 4. Oil fuel - Specific gravity 5. Oil fuel - Viscosity 6. NRL P 1160

Evaluation of combustion flames and selected solid materials. First quarterly scientific report for the period 1 Apr 1956 - 30 Jun 1956 under Contract AF 19(604)-1885, by H.D. Rix. Haller, Raymond and Brown, Inc., State College, Pa. Jun 1956. 8p. Order from LC. Mi $1.80, ph $1.80. PB 124733

The preliminary phase of the flame studies project has been confined to a general survey of unclassified materials. This report summarizes publications and reports at symposium meetings. Unclassified 26 Jul 1956. AF CRC TN 56-558.

Neues prüfverfahren für umlauföle (New testing method for circulating lubricating oils), by F. Eisenstecken. Translated and edited by F.A. Raven. Mar 1956. 11p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122859

The methods heretofore used for judging circulating lubricating oils, particularly those based on the neutralization and saponification numbers, furnish no constant factor concerning the aging state of the oils utilized. Conversely, by artificial aging and determination of the content consisting of resinous and asphaltous precipitations in conjunction with the values of the neutralization and saponification numbers, an aging factor can be computed which gives information concerning the further usability of the oil in question. The new testing method has been subjected to trials and tests, using many samples of turbine and motor oils. Translated from VDI-Zeitschrift, vol. 97, no. 35, 11 Dec 1955, pp. 1279-1281. NAVSHIPS T606 STS 233.

Reclamation of synthetic base oils, by Richard W. Sneed and H.M. Schiefer. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1957. 17p tables. Order from OTS. 50 cents. PB 131181

The feasibility of the reclamation of synthetic base oils, specifically of the diester type has been investigated. Various filtration, percolation, and distillation techniques have been employed in an attempt to clean used oils to such an extent as to make them reusable, either as an aircraft gas turbine engine lubricant or as a plasticizer grade ester. It has been determined that hydraulic fluid used for flushing alternator drives can be filtered and used again instead of being discarded as is the present practice in depots. Preliminary studies of reclamation procedures for used engine oils indicate that full scale reclamation is possible. However, considerable work would have to be done to ascertain the efficiency and economy of the reclamation operation and also the problems involved with full scale operation of engine with reclaimed oil. AD 118110. Project 3044, Task 73314. Covers work from Mar 1954 - Mar 1955. AF WADC TR 56-275.

Research on the flammability characteristics of aircraft hydraulic fluids, by Michael G. Zabetakis, Aldo L. Furno and Joseph J. Miller, Jr. U.S. Bureau of Mines. Division of Explosives Technology, Pittsburgh, Pa. May 1957. 34p graphs, tables. Order from OTS. $1.00. PB 131193

The results of minimum spontaneous ignition temperature tests conducted on seven hydraulic fluids while in contact with seven surfaces found in aircraft under conditions likely to be encountered in practice are presented here. The effects of both test chamber pressure and injection pressure variations were investigated. AD 130764. Project 3044, Task 73314. Covers work from 1 Nov 1955 - 31 Oct 1956 under Contract AF 18(600)-151. AF WADC TR 57-151.

Studies on the hydrogenation of coal. III: Test results using various catalysts. V: Action of catalysts on coal paste, by S. Kurokawa, K. Hirota, K. Fugiwara and S. Askakoka. Revised and edited by J.L. Wiley with preface by R.C. Grass. U.S. Bureau of Mines. Apr 1953. 190p graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 124297

Information circular (unnumbered). Reports 39, 2 Mar 1939 and 1954, 15 Jan 1944, Imperial Fuel Research Institute of Japan, Munitions Ministry, (now Ministry of Commerce and Industry) translated by the Japanese Translation Service, Pasadena, Calif.

INSTRUMENTS

Calendar demonstration routine, by R.J. Hamlin and E. Raiffa. Massachusetts Institute of Technology. Digital Computer Laboratory, Cambridge, Mass. Mar 1955. 3p tables. Order from LC. Mi $1.80, ph $1.80. PB 123930

AD 71415. 1. Calendars - Computation 2. MIT DCL M 57.

Construction of a goniometer for use in determining the candlepower characteristics of beacons, by Franklin C. Breckenridge and T.H. Projector. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1944. 10p photos, graphs. Order from LC. Mi $1.80, ph $1.80. PB 122298

1. Goniometers - Design 2. Radiobeacons - Testing equipment 3. CAA TDR 39

Development of a dynamic air traffic control simulator, by Richard E. Baker, Arthur L. Grant and Tirey K. Vickers. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1953. 13p photos, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 127846

1. Simulators, Air traffic control 2. CAA TDR 191

Development of a photographic instrument recorder, by Cecil B. Phillips. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1952. 13p photos, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127842

1. Recorders, Photographic 2. CAA TDR 163

Exploding wire light source for high speed interferometry, by M.R. Lewis and D.B. Sleator. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1956. 33p photos, diagrs, graphs, table. Order from OTS. $1.00. PB 121423

The development of a short duration light source (three microseconds to half peak) of high intensity from an exploding wire is described. Experimental procedures are given. Tables and oscilloscope traces of intensity versus time as a function of various wire parameters are presented. The use of yarns made of extremely fine wire such as steel wool or flash bulb filler seems to account for the short duration. The light is of such an intensity that a bandwidth of 16A° in the 4358A° region yields interferograms of greater density and contrast than those obtained with the BH-6 tube source previously used. Dept. of the Army project no. 5B03-03-001. Ordnance research and development project no. TB-3-0108. APG BRL M 975.

High pressure reducing valves, by D.L. Hay. U.S. Naval Research Laboratory. Nov 1936. 19p photos, drawings. Order from LC. Mi $2.40, ph $3.30. PB 122741

1. Submarines - Air - Analysis 2. Valves, High pressure 3. NRL 0 1327

Modified blender cup for homogenizing small tissue samples, by N. Burr Furlong, Jr. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1957. 11p photo, drawings. Order from OTS. 50 cents. PB 131207

This report describes a device which adapts a standard tissue blender motor for the homogenization of tissue samples from 1 to 20 grams in weight. The homogenizer cup is airtight and incloses approximately 100 cc of gases when sealed. AD 110720. Project 7159, Task 71803. AF WADC TN 57-16.

Monthly progress report under Contract no. DA 36-034-ORD-1646, by Herman H. Goldstine. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N.J. Project no. TB3-0538. Order separate parts described below from LC, giving PB number of each part ordered.

Oct 1955. $1.80.	8p table.	Mi $1.80, ph	PB 124165
Dec 1955. $3.30.	13p tables.	Mi $2.40, ph	PB 124105
Mar 1956. $1.80.	8p table.	Mi $1.80, ph	PB 124166
Apr 1956. $1.80.	5p table.	Mi $1.80, ph	PB 123155
May 1956. $1.80.	7p table.	Mi $1.80, ph	PB 123170

For other reports under this contract see PB 118659-118660, 119072, 120319-120320.
1. Computers, Electronic - Components
2. Computers, Electronic - Coding
3. Computers, Electronic - Uses

Nuclear meters for measuring soil density and moisture in thin surface layers, by D.J. Belcher, T.R. Cuykendall and H.S. Sack. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind., and Cornell University, Ithaca, N.Y. Feb 1952. 10p photos, drawings, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 127840

1. Soils - Moisture content - Measuring equipment 2. Soils - Density - Measuring equipment 3. Meters, Moisture 4. Meters, Nuclear - Design 5. CAA TDR 161

On-line automatic data reduction at the Arnold Engineering Development Center, by David F. Taylor. U.S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Oct 1956. 23p photos, diagr. Order from LC. Mi $2.70, ph $4.80. PB 124292

This report describes the automatic data reduction system at Arnold Engineering Development Center which is capable of measuring, scanning, computing, and presenting test results in one continuous operation. Operating modes of the components of the system are described; and the versatility, reliability, and efficiency of the system and its components, which are commercially available equipment, are discussed. Possible refinements in the system are pointed out. AD 98975. Contract AF 40(600)-700. AF AEDC TN 56-13.

Operation and use of the California Institute of Technology lens-type solar furnace, by Nevin K. Hiester, Eugene Loh and Thomas E. Tietz. Stanford Research Institute. Menlo Park, Calif. Apr 1956. 27p photos, diagrs, graph. Order from LC. Mi $2.70, ph $4.80. PB 125051

AD 88368. Technical report no. II. Report no. 5. For Reports no. 3 (Technical report no. I) and no. 6 see PB 122883 and 124331; for Final summary report see PB 121930. Appendix A: Effect of the position of the sun on the heat flux received by a horizontal plate. - Appendix B. Change in atmospheric absorption with position of the sun. 1. Furnaces, Solar - Performance 2. Furnaces, Solar - Theory 3. Furnaces, Solar - Design 4. Contract AF 18 (600)-1499, Report 5 5. AF OSR TN 56-248 6. SRI TR 11 7. SRI Project CU-1410

Payroll demonstration routine, by B. Riskin. Massachusetts Institute of Technology. Digital Computer Laboratory, Cambridge, Mass. Jan 1955. 3p tables. Order from LC. Mi $1.80, ph $1.80. PB 123929

AD 71412 1. Payrolls - Computation 2. MIT DCL M 47

Portable pictorial computer, type III. Part II: Technical and operational evaluation, by Edward M. Blount, Hugh A. Kay, Raymond E. McCormick, Fred S. McKnight and Marvin H. Yost. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1954. 35p photos, maps, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 127848

This report describes the technical and operational evaluation of the equipment. Part I, Technical Development Report No. 172, covered the development of this airborne navigational aid. Laboratory tests showed that the maximum average errors (the greatest error occuring in the average results of repeated tests for a given point) of the display in bearing and distance do not exceed 0.2 and 0.5 mile, respectively. Operational evaluation tests indicate that the equipment will provide continuous position information in all airspace within range of an OBD facility. By displaying position information directly on a chart, the Type III unit reduces the mental workload required of the pilot for navigation. This is particularly advantageous for flight in involved terminal-area patterns. CAA TDR 209.

Portable ultra-violet lantern, by E.O Hulburt. U.S. Naval Research Laboratory. May 1943. 11p photo, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 120593

Unclassified 15 Dec 1953. 1. Lanterns, Ultraviolet - Design 2. Lanterns, Ultraviolet - Tests 3. Ultraviolet illumination 4. NRL H 2067

Program for transferring binary information back and forth between paper tape and magnetic tape, by Sheldon Best. Massachusetts Institute of Technology. Digital Computer Laboratory, Cambridge, Mass. Nov 1954. 8p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 123928

AD 71383. 1. Tape, Computer - Materials 2. Information - Transference 3. MIT DCL M 12, Supplement 1.

Programs for solving secular equations, by F.J. Corbató. Massachusetts Institute of Technology. Digital Computer Laboratory, Cambridge, Mass. Mar 1955. 12p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123931

AD 71418. 1. Mathematical equations and solutions 2. MIT DCL M 58

Research on the flammability characteristics of aircraft fuels, by G.W. Jones, M.G. Zabetakis, J.K. Richmond, G.S. Scott and A.L. Furno. U.S. Bureau of Mines. Explosives and Physical Sciences Division, Pittsburgh, Pa. Jun 1952. 103p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 127339

The results of limit of flammability, limit of ignitibility, and ignition temperature tests conducted on aircraft fuel vapor-air mixtures by the U.S. Bureau of Mines Gaseous Explosions Laboratory between February 19, 1950 and February 19, 1952 are presented. Two aviation gasolines grades 100/130 and 115/145, and two jet fuels grades JP-1 and JP-3, were investigated. A limited amount of work was done on the ignitibility of JP-1 mists and sprays, and on the ignition temperatures of aircraft hydraulic fluid AN-0-366. In addition to the above results, sections are included on definitions and theory, and apparatus used for the investigation is described. Contract AF 33(038)-50-1293E. AF WADC TR 52-35.

Supplement 3. Feb 1955. 28p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127339s3

The results of limits of flammability, limit of propagation and ignition temperature tests conducted on aircraft oil and on aircraft fuel components in air by the U.S. Bureau of Mines, Gas Explosions Branch, between 1 February 1954 and 1 October 1954 are presented. One aircraft oil and a number of pure paraffin and aromatic hydrocarbons were used in the investigations. Project 3048. Contract AF 18(600)-151. AF WADC TR 52-35, Suppl. 3.

Scientific and engineering computation group operators' check list, by Joseph W. Thompson. Massachusetts Institute of Technology. Digital Computer Laboratory, Cambridge, Mass. 9p. Order from LC. Mi $1.80, ph $1.80. PB 123932

1. Computers, Digital - Operation 2. Contract N5-ori-06001 3. MIT DCL M-69

Second survey of domestic electronic digital computing systems, by Martin H. Weik. U.S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jun 1957. 439p photos, diagrs, tables. Order from OTS. $7.00. PB 111996r

Based on the results of a survey, the engineering and programming characteristics of 103 different electronic digital computing systems are given. An analysis of the survey data, 15 comparative tables, a discussion of trends, a bibliography, and a complete glossary of computer engineering and programming terminology are included. Dept. of the Army project no. 5B0306002. Ordnance Research and Development project no. TB 3-0007. Supersedes BRL R 971 (PB 111996). APG BRL R 1010.

Spark ignition of fuel mists: Development of apparatus and preliminary results, by A.E. Weller. Battelle Memorial Institute, Columbus, O. Dec 1956. 31p drawing, diagrs, graphs, table. Order from OTS. $1.00. PB 121855

Ignition tests were made on a kerosene mist at an air-fuel ratio of about 31 lb/lb and a calculated droplet size of 40 microns. Most of the tests were made with a spark energy of 212 millijoules and with electrode spacings between 0.02 and 0.20 inches. Calculations indicate that ignition of a liquid fuel mist may proceed as a two-step process. First, some of the fuel is vaporized, and second, the vapor is ignited. If this is true, it appeared that the minimum energy which could ever result in an ignition occurs for a mixture leaner than stoichiometric. AD 110683. Project 3012, Task 70334. AF WADC TR 55-430.

Study of the Dwyer zero to five percent carbon dioxide indicator to determine its suitability for Naval use, by Myron H. Boyer. U.S. Naval Research Laboratory. Jul 1942. 23p drawing, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120568

See also PB 120627 and 120628. 1. Indicators, Carbon dioxide - Tests 2. NRL P 1877-A

Tests of tubular chromel-alumel thermocouples, by Andrew I. Dahl and Paul D. Freeze. U.S. National Bureau of Standards. May 1952. 10p photo, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 124154

This report presents the results of response rate and recovery factor tests of two experimental chromel-alumel thermocouples. The thermoelements are tubular in form and the sensing junction made by butt-welding the elements. ATI 170-115. Contract AF 33(038)-51-4063. AF WADC TR 52-122.

Theoretical analysis of the response of proton recoil type neutron detector, by Sven R. Hartmann. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1957. 55p diagrs, graphs. Order from OTS. $1.50. PB 131204

A calculation is made to determine the number of recoil protons produced per unit area, by a neutron flux of arbitrary energy, in an infinite hydrogenous slab which reaches but does not pass through an infinite detector slab located immediately behind a hydrogenous slab. A general case is considered for an isotropic neutron flux incident upon the above system in which an arbitrary thickness of some proton absorbing material separates the hydrogenous and detector slabs. A discussion of the results is given indicating how one can control the energy and the energy interval over which the system is sensitive to neutrons. A final calculation is made to determine the response of the system to a collimated neutron flux for an arbitrary orientation of the hydrogenous-detector system. This is done so that the effect of a nonisotropic flux can be determined. AD 118272. Project 6002, Task 73075.

Covers work from 20 Jun 1956 - 7 Dec 1956. AF WADC TR 56-657.

Thermistor as a flowmeter, by Robert W. King, Jr. New York University. Research Division, New York, N.Y. Oct 1951. 11p graphs. Order from LC. Mi $2.40, ph $3.30. PB 123592

Project Squid, Technical memorandum NYU-10. 1. Thermistors - Uses 2. Meters, Flow - Electromagnetic 3. Contract N6 ori-11, NR 220-040, Phase 8

Ultracentrifuge as an instrument for testing adhesion, by R.L. Patrick. Quantum, Inc., Mt. Carmel, N.Y. Mar 1956. 31p photos, drawings, diagrs, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 128431

This report describes the development of the techniques of centrifugation to a point where the procedure is completely practical as a testing method for the examination of adhesion. Originally only metal substrates could be considered. The most recent modifications allow the use of may other substrates, including glass. A complete description of the apparatus and modifications is included AD 95760. Project 7340, Task 70337. Contract AF 33(616)-2465. AF WADC TR 55-480.

METALS AND METAL PRODUCTS

Acoustical method for determination of laminations in plates, by H.C. Hayes. U.S. Naval Research Laboratory. Apr 1936. 19p drawing, table. Order from LC. Mi $2.40, ph $3.30. PB 122744

1. Nondestructive tests 2. Steel plates - Defects - Determination 3. Steel plates - Acoustic properties 4. NRL M 1260

Analysis of dynamic creep considering strain rate effects, by F.H. Vitovec. Minnesota. University, Minneapolis, Minn. May 1957. 21p graphs, tables. Order from OTS. 75 cents. PB 131256

The dynamic creep behavior of a number of materials is discussed and classified. The creep properties under simultaneous action of static stress and alternating stress have been derived by several authors from the creep rate-stress relationship under static load. The theoretical analysis of the strain rate effects in dynamic creep, presented here, conform with the experimental observation that retardation of creep increases with temperature, and with increasing alternating stress frequency if metallurgical effects are negligible. AD 130762. Project 7360, Task 73604. Covers work from Feb 1956 - Jan 1957 under Contract AF 33(616)-2803. AF WADC TR 57-104.

Analysis of temperature coefficients of solubility in dilute liquid metal solutions, by S.W. Strauss, J.L. White and B.F. Brown. U.S. Naval Research Laboratory. Jun 1957. 23p graphs (1 fold). Order from OTS. 75 cents. PB 131065

Temperature coefficients of solubility taken from the literature were compared with (a) electronegativities of solvent and solute, and (b) relative atomic sizes of solvent and solute, in order to identify the fundamental factor or factors which determine the temperature coefficient of solubility of a solid metal in a second liquid metal. NRL R 4961.

Application of ultrasonic energy to cold welding of metals, by J. Byron Jones and Carmine F. DePrisco. Aeroprojects Inc., West Chester, Pa. Nov 1953. 61p photos, drawing, diagrs, graphs, table. Order from OTS. $1.75. PB 131083

Equipment was devised and experiments were carried out in the ultrasonic spot and seam welding on non-ferrous sheet material in .005" and .010" gages without the use of elevated temperatures. Ultrasonically spotwelded 2S aluminum developed adequate strength and pressure-sealing characteristics in reasonable ultrasonic exposure time and at reasonable power levels. Internal deformations of the faying surfaces were present, but no comparable external indentation occured. No corrosion effects were evident after 2000 hours of exposure to salt water or to aerated distilled water at 95°C. Preliminary experiments indicated that other metals, particularly brass, copper, and gilding metal, can be ultrasonically welded. Ordnance Corps project no. TB 4-31G-3. Research report 53-77. Contract DA 36-034-ORD-1007, Final report.

Corrosion of metals in tropical environments. Part I: Test methods used and results obtained for pure metals and a structural steel, by A.L. Alexander, B.W. Forgeson, H.W. Mundt, C.R. Southwell and L.J. Thompson. U.S. Naval Research Laboratory. Jun 1957. 46p photos, map, graphs, tables. Order from OTS. $1.25. PB 121952

An extensive investigation has been in progress since 1940 in the Panama Canal Zone to study the corrosion rates and characteristics of fifty different metals and alloys exposed to five natural tropical environments for periods on one, two, four, eight, and sixteen years. Up to the present specimens through the eight year period have been removed and examined. This report describes the corrosion rate of aluminum, lead, nickel, zinc, and copper along with structural steel. NRL R 4929.

Corrosive effects of protein-type foam-forming concentrates on common metals and dissimilar metal couples, by H.B. Peterson and J.C. Burnett. U.S. Naval Research Laboratory. Jun 1957. 22p photos (1 fold), graphs, tables. Order from OTS. 75 cents. PB 131018

An investigation has been conducted on the corrosive behavior of the four foam concentrate materials currently approved under specification JAN-C-266 on various common metals of construction. Stainless steel 304 was the most resistant; brass and copper were next and essentially equal; steel and aluminum followed in an order dependent on the source of foam material. In some cases, aluminum alloys were considerably superior to steel. Attention was given to galvanic couples because of corrosion problems encountered in the aircraft fire fighting vehicles. Aluminum was anodic to all metals except zinc and magnesium and presents a severe corrosion problem. Steady-state electrical current measurements, reached after about 100 hours of exposure, were found to be good indicators of the relative intensity of corrosion. NRL R 4947.

Creep of single crystals and polycrystals of aluminum, lead and tin, by C.D. Wiseman, O.D. Sherby and J.E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Nov 1955. 22p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 125072

Elevated temperature creep tests were performed on single crystals and polycrystals of Ai, Pb and Sn under constant tensile stress as a function of temperature. Analyses of the results revealed that the activation energies for creep of the polycrystals equal the respective activation energies for creep of single crystals. For Ai and Pb the activation energies for creep were found equal to the respective activation energies for volume diffusion suggesting evidence for a dislocation climb model for high temperature creep. Contract N-7-onr-295, T.O. II, NR-031-048, Technical report 43. UC IER Series 22, Issue no. 43.

Descriptions of some current methods for determining creep properties under compressive, bearing and shear type of loading, by E.L. Horne. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1957. 32p photos, drawings, diagrs, graph. Order from OTS. $1.00. PB 131259

This report gives descriptions of several methods currently used for evaluating creep behavior in compressive, bearing and shear types of loading. Four methods for compressive creep testing are described. Two methods for bearing creep and four methods for shear creep, respectively, are also given. Only unclassified and non-proprietary information are discussed. AD 130802. Project 7360, Task 73605. Covers work from Jul 1956 - Mar 1957. This report was presented before the Aviation Panel of the ASTM-ASME Joint Committee on Effect of Temperature on Properties of Metal, 27 Nov 1956 at Hotel Statler, New York, N.Y. AF WADC TR 57-297.

Dispersed hard particle strengthening of metals, by Nicholas J. Grant and Oliver Preston. Massachusetts Institute of Technology, Cambridge, Mass. Nov 1956. 34p photos, graphs, tables. Order from OTS. $1.00. PB 131221

A review is presented of the various methods utilized to strengthen metals and alloys for high temperature service by a suitable dispersion of finely divided hard particles. Alloys such as SAP, produced by powder metallurgy, and other sintered aluminum powders, molybdenum containing small quantities of refractory oxides and magnesium containing a dispersed intermetallic, are considered. Internal oxidation and other methods of achieving a hard particle dispersion are discussed. New data on the high temperature strength and stability of the alloy systems Cu - Al_2O_3, Ni - Al_2O_3 and Be - Be_2C are shown. The theoretical aspects of the hardening and strengthening mechanism are presented and consideration is given to the problems associated with the powder metallurgy of the various processes. AD 118021. Project 7351, Task 70627. Contract AF 33(616)-284. AF WADC TR 56-359.

Effect of mass upon the mechanical properties of cast steel, by C.W. Briggs and R.A. Gezelius. U.S. Naval Research Laboratory. Jul 1937. 37p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 122758

Parts of this report may not reproduce well.
1. Steel castings - Mechanical properties 2. Steel, Cast - Mechanical tests 3. NRL M 1376

Effect of prior partial transformation of austenite on subsequent isothermal transformation at lower temperatures, by Harold J. Hucek, E. Ellis Fletcher, Admiral A. Watts, Arthur R. Elsea and George K. Manning. Battelle Memorial Institute, Columbus, O. Sep 1955. 35p photos, graphs, tables. Order from OTS. $1.00. PB 121189

An investigation of the effects of prior partial transformation at one temperature upon subsequent transformation at a lower temperature showed that the effects were not the same in the three steels studied. The product initiated at a high temperature did not continue to grow at the lower reaction temperature in an SAE 4340 steel and a 1.0 per cent chromium-0.50 per cent carbon steel. Data for a eutectoid steel, which contained 0.80 per cent chromium and 0.75 per cent carbon suggested that, when large percentages of transformation product were formed at the higher temperature, the particles continued to grow at the lower temperature, provided the products formed at the two temperatures were similar. Project 7351, Task 70645. Contract AF 33(616)-2025. AF WADC TR 55-341.

Effects of small tin and cadmium additions to aluminum-copper alloys, by H.V. Seelinski and R.C. Harris. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. Mar 1957. 36p photos, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 127771

An investigation was made of the effect of additions of small quantities of tin and cadmium on the aging characteristics and tensile properties of cast and heat-treated aluminum-copper alloys (aluminum-4.5 per cent copper). Tin additions are slightly more than the cadmium. Project TB 4-202. FALR 1381.

Effects of inelastic action on the resistance to various types of loads of ductile members made from various classes of metals. Illinois. University. Dept. of Theoretical and Applied Mechanics, Urbana, Ill. Contract AF 33(616)-2753. Project 7360, Task 73605. Order separate parts described below from OTS, giving PB number of each part ordered.

Part IV: Eccentrically-loaded columns having angle- and T-sections, by M.E. Clark and O.M. Sidebottom. May 1957. 38p photo, diagrs, graphs, table. $1.00. PB 131252

This paper presents the results of an analytical and experimental investigation for the determination of the load necessary to produce any given depth of yielding in angle- and T-section columns subjected to eccentric loads. This load is found analytically from the intersection of a constant depth of yielding interaction curve and the moment-load curve (see Part I of this Report). The collapse load of the column can be taken as the maximum load given by the moment-load curve. AD 130765. Covers work from Apr - Nov 1956. AF WADC TR 56-330, Part 4.

Part V: Inelastic behavior of aluminum alloy I-beams with elliptical web section cutouts, by Will J. Worley. May 1957. 32p photos, drawings, diagrs, graphs, tables. $1.00. PB 131245

This report represents an extension of WADC Technical Report 56-330, Part II (PB 131028). This extension was undertaken to investigate the plastic bending behavior of aluminum alloy I-beams with elliptical web section cutouts. As in the above report, the mechanism method of analysis employing the upper bound theorem was used in predicting the ultimate loads of the various beams. This procedure could not be applied in all cases since several of the beams failed by buckling failures in the web sections. The I-beams were loaded in pure bending using quarter point loading and in combined shear and bending using center point loading. The span lengths were varied for a given depth of I-beam in order to investigate the effects of shear on the failure mechanism. Where the mechanism analysis applies, it permits the prediction of loads which are in good agreement with the experimental results. AD 130768. AF WADC TR 56-330, Part 5.

Engineering relationship of the absolute rate theory to the creep of lead, by Mervin B. Hogan. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jun 1956. 98p photos, diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126638

A number of data obtained experimentally from the creep of lead and reported in three Bell Telephone Laboratories Research Department Technical Memoranda have been analyzed in terms of the absolute rate theory employing a four-element mechanical model. This effort is a continuation of earlier work by the writer investigating the engineering utility of the absolute rate theory when applied to the creep of lead. In the present case, as in the previous analyses, a satisfactory correlation is found between the creep of lead and the absolute rate theory. The writer, therefore, again concludes that the absolute rate theory is an adequate hypothesis for engineering application to the creep of lead. Contract N7 onr-45101, NR 032-168. UU ISRP TR 53.

Additional engineering applications of the absolute rate theory to the creep of lead, by Mervin B. Hogan. Jun 1956. 97p diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 126640

The results reported in this study are a continuation of his "Engineering application of the absolute rate theory to the creep of lead", published in Nov 1955 as Bulletin no. 75 of the University of Utah Engineering Experiment Station. This analysis is based on results of experiments reported in four bulletins of the University of Illinois Engineering Experiment Station between 1932 and 1943. Data is analyzed from the standpoint of the absolute rate theory and a four-element mechanical model. Results lead to the conclusion that the absolute rate theory is a highly satisfactory engineering hypothesis with which to treat creep of lead. Contract N7 onr-45101, NR 032-168. UU ISRP TR 51.

Further engineering applications of the absolute rate theory to the creep of lead, by Mervin B. Hogan. Jun 1956. 57p diagr, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 126639

This report analyzes two additional Technical memoranda published by the Bell Telephone Laboratories Research Dept., in terms of the Eyring rate theory. Satisfactory agreement between experimental results and theory is again found to exist. Contract N7 onr-45101, NR 032-168. UU ISRP TR 52.

Factors responsible for notch embrittlement of high-strength steels. Bi-monthly progress report no. 2 for period ending 15 Apr 1955 under Contract NOas-55-377-C, by V. Weiss and E.P. Klier. Syracuse, University. Research Institute. Apr 1955. 4p graphs. Order from LC. Mi $1.80, ph $1.80. PB 124091

AD 71098. 1. Jominy tests 2. Steel - Hardenability - Tests 3. Steel - Notch sensitivity 4. Steel - Heat treatment - Research

Fatigue tests on notched and unnotched sheet specimens of 2024-T3 and 7075-T6 aluminum alloys and of SAE 4130 steel with special consideration of the life range from 2 to 10,000 cycles, by Walter Illg. U.S. National Advisory Committee for Aeronautics. Dec 1956. 40p photos, drawing, tables. Order as TN 3866 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124417

Fatigue tests were performed on notched and unnotched fatigue specimens made of 2024-T3 and 7075-T6 aluminum alloys and of SAE 4130 steel. The notched specimens had theoretical stress-concentration factors of 2.0 and 4.0 and the mean loads were 0 and 20 or 50 ksi. It was found that repeated applications of stresses in the vicinity of the ultimate strength on notched and unnotched specimens produced failures in a much smaller number of cycles than might be inferred from previously published data. Ratios of fatigue strengths of unnotched specimens to those of notched specimens are given. NACA TN 3866.

Fluidity of cast steel. Progress report, by C.W. Briggs, R.A. Gezelius and J.L. Darby, Jr. U.S. Naval Research Laboratory. Apr 1936. Order from LC. Mi $3.60, ph $9.30. PB 122746

Parts of this report may not reproduce well. 1. Steel castings - Fluidity - Tests 2. Steel castings - High temperature tests 3. NRL M 1264

High purity silicon. Quarterly technical report no. 10 for the period 1 Jul 1953 - 30 Sep 1953 under Contract DA 36-034-sc-5550, by F.B. Litton. Foote Mineral Company. Research and Development Laboratories, Berwyn, Pa. Oct 1953. 20p tables. Order from LC. Mi $2.70, ph $4.80. PB 124104

The resistivity of modified iodide process silicon was increased as a result of substituting a hydrocarbon stopcock grease for "Silicone" and increasing the volitalization rate of SiI_4 over the hot filament. It was observed that the resistivity of modified iodide process silicon varied as much as one hundred-fold at various locations along the length of the filament. Future work was planned to determine the variation in resistivity as a function of tetraiodide volatilization rate. Silicon metal prepared from silicon tetraiodide crystallized from solution in carbon tetrachloride indicated that impurities in the tetraiodide were not selectively dissolved in this solvent. No further work was planned on this approach. Research was conducted to prepare source silicon from SiO_2 by (a) magnesium reduction, (b) carbon reduction, and (c) electrolytic reduction of potassium silicofluoride. Metal was prepared through magnesium reduction of sand, but sufficient metal was not obtained by either of the two other procedures for processing through the modified iodide process. A relatively pure silicon metal was prepared by magnesium reduction of sand. DA project: 3-99-15-022. Signal Corps project: 44-152-B.

Intermittent stressing and heating tests of aircraft structural metals, by John Salvaggi. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. May 1957. 76p photo, graphs, tables. Order from OTS. $2.00. PB 131210

Previous studies on the high-temperature creep and rupture behavior of a number of aircraft structural materials exposed to relatively simple intermittent-load or intermittent-heat test conditions emphasized the fact that each alloy system behaves in its own characteristic manner. Five of these materials, C-110M titanium, A-70 titanium, type 321 stainless steel, N-155 alloy, and 4130 steel were selected for further evaluation under the more complex conditions of combined intermittent temperature and load. Analysis of these test results disclosed little difference in creep and rupture behavior relative to the intermittent-load or intermittent-heat results. In general, the basic mechanisms or causes responsible for the behavior patterns noted in the simpler environments of constant-temperature intermittent-load and constant-load intermittent-temperature are relatively unaffected by the phase relationships of the combined cyclic-load and temperature test conditions utilized in this study. AD 118293. Project 7360, Task 73605. Covers work from Aug 1954 - Aug 1955 under Contract AF 33(616)-2226. AF WADC TR 53-24, Part 4.

Investigation of a new method for the determination of the coefficients of surface diffusion of metals. Final progress report under Contract no. AF 18 (600)-644, by Peter F. Mataich. Horizons Inc., Cleveland, Ohio. Sep 1956. 65p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 121956

This report contains the results of a series of experiments which were made in an attempt to develop new methods for determining the surface diffusion coefficients of metals. The methods which were evaluated used three basically different types of measurement, an optical method which followed the height changes of a diffusing strip using interferometric measurements, an electrolytic method which utilized a solid electrolyte to transform the mass flow of the diffusing atoms into an electric current, and an autoradiographic method which utilized photographic processes to trace the progress of the diffusing atoms. AD 110344. Project R-355-30-2. AF OSR TR 56-54.

Low carbon iron alloys. Partial report, by F.M. Walters, Jr., I.R. Kramer and S.L. Toleman. U.S. Naval Research Laboratory. Dec 1941. 23p photo, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122689

1. Iron alloys - Hardness tests 2. Iron alloys - Tensile tests 3. Iron alloys - Chemical analysis 4. NRL M 1821.

New concept of hydrogen embrittlement in steel, by J.G. Morlet, H.H. Johnson and A.R. Troiano. Case Institute of Technology, Cleveland, O. Mar 1957. 50p photos, drawing, diagrs, graphs, tables. Order from OTS. $1.25. PB 131200

The influence of plastic strain on the aging characteristics of hydrogenated 43-40 steel has been evaluated. Present theories cannot explain the modification of the recovery curve introduced by plastic deformation. A consistent interpretation of the data results from the hypothesis that hydrogen exerts a maximum embrittling effect in the region of most severe stress state. Hydrogen occluded in internal voids is non-damaging; embrittlement is shown to result from hydrogen in solution. AD 118155. Project 7351, Task 70645. Contract AF 33(616)-3431. AF WADC TR 57-190.

On the structure of the rhenide ion, by J.W. Cobble. Purdue University. Dept. of Chemistry, Lafayette, Ind. Jul 1956. 11p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 124142

The thermodynamic factors controlling the stability of the rhenide ion have been examined. The conclusion is reached that rhenides must be "hydrated" to be stable. Other ions of this general type are also examined. AD 95434. AF OSR Chem. 30-39. Contract AF 18(600)-1525. AF OSR TN 56-348.

Preferred orientations and kinetics of recrystallization in titanium, by Cullie J. Sparks, Jr. and Joseph P. Hammond. Kentucky Research Foundation, Lexington, Ky. Jul 1956. 73p photos, table, diagrs, graphs. Order from OTS. $2.00. PB 121693

Preferred orientations were produced in titanium by cold rolling and cross rolling and in a titanium-aluminum alloy by cold rolling. The reorientations occurring during annealing were studied quantitatively using an x-ray diffractometer. The kinetics of recovery and recrystallization were studied for isothermelly annealed 94% cold-rolled titanium. This included grain growth, hardness, line breadth recovery and measurements of reorientation on annealing. Activation energies for the several processes were calculated and compared. Titanium was found to behave somewhat different than other metals to annealing. The process of recovery and recrystallization occurs almost simultaneously in cold-rolled titanium. Variation of yield strength with direction in the rolled sheet for commercial titanium and a titanium-aluminum alloy were found to be qualitatively predictable by applying the law of critical resolved shear stress to the pole figures of annealed sheet. Because of mechanical fibering, the yield strength of the cold-rolled sheet did not follow the predictions. AD 110470. Project 7351. Summarizes work from Aug 1954 to Jul 1956 under Contract AF 33(038)-19574. AF WADC TR 56-421.

Pressure losses of titania and magnesium slurries in pipes and pipeline transitions, by Ruth N. Weltmann and Thomas A. Keller. U.S. National Advisory Committee for Aeronautics. Jan 1957. 22p photo, diagr, graphs, table. Order as TN 3889 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124432

Experimental and calculated pressure losses are presented for Newtonian fluids and non-Newtonian slurries for laminar, transitional, and turbulent flow in straight piplines and pipe transitions such as valves, 90° elbows, contractions, and expansions. Transition loss coefficients, which are independent of the flow rate in the pipeline even in laminar flow, were determined for these transitions. It was found that the transition loss coefficients for Newtonian fluids can be used in the calculations for the design of a pipeline system for the non-Newtonian slurries studied. NACA TN 3889.

Research of the weldability of iron alloys. First partial report, by W.H. Bruckner. U.S. Naval Research Laboratory. Apr 1936. 41p photos, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122761

Includes a review of "Thermal study of welds" (Etude thermique des sondures), by Prof. A. Portevin and D. Seferian, from Chaleur et Industrie, Vol. 16, no. 185, Sep 1935, pp. 409-424. Text of the review in French. Parts of this report willnnot reproduce well. 1. Iron alloys - Ductility 2. Iron alloys - Hardness - Tests 3. Iron alloys - Impact tests 4. Iron alloys - Weldability - Tests 5. NRL M 1258.

Spectrographic analysis of solid titanium, by Jack A. Winstead. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory. Wright-Patterson Air Force Base, Dayton, O. May 1957. 27p graphs, tables. Order from OTS. 75 cents. PB 131185

The purpose of this work was to establish satisfactory excitation conditions for spectrographic analysis of solid titanium and to obtain data from analysis by the established technique. Each specimen was cut in half and then nine analyses were made on each individual piece, totalling thirty-six analyses for each alloy sample. These analyses were made

and data included in this report. AD 118273. Project 7360, Task 73601. Covers work from Dec 1955-May 1956. AF WADC TR 56-500.

Strength and corrosion resistance of ultrasonically soldered aluminum joints, by J. Byron Jones and John G. Thomas. Aeroprojects Inc., West Chester, Pa. Mar 1956. 61p photos, graphs, tables. Order from OTS. $1.75. PB 121965

Ultrasonic soldering techniques were effectively used to prepare aluminum joints with a variety of tin-base, cadmium-base, and zinc-base solders. Corrosion resistance of the joints was evaluated by determining strength decay resulting from alternate immersion in 3.5% salt solution and comparison with earlier results in a boiling, aerated, distilled water environment. The most effective solder for salt-water immersion was 95% zinc-5% aluminum-silicon alloy which had been stress-relief-annealed after the joint was prepared. Other solders containing zinc content of 14% or greater alloyed with tin and/or aluminum showed comparatively good resistance in this environment. Tin-base solders containing small percentages of zinc or copper had been most effective for distilled -water immersion. It was concluded that solders for aluminum joints must be selected specifically for the environments in which they are to be used. Dept. of the Army Project DA 5B 9205007. Ordnance Corps project TB4-31G-M59. Aeroprojects Research Report 56-13. Contract DA 36-034-ORD-1665, Final research report.

Subgrain and electrical resistivity studies of molybdenum single crystals, by K.T. Aust and R. Maddin. Johns Hopkins University, Baltimore, Md. Jul 1955. 24p photos, diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 124483

The present investigation was initiated to determine under what conditions polygonization or subgrain formation may occur in bent molybdenum single crystals. Electrical resistance measurements were conducted in order to obtain a quantitative measurement of the changes occurring during recovery and polygonization. Includes (as Part II) summary report for period 1 Jan 1950 -31 Jul 1955 under Contract Nonr-248(05), NR 034-403.

Ultrasonic welding of metals, by J. Byron Jones, Carmine F. DePrisco and John G. Thomas. Aeroprojects, Inc., West Chester, Pa. Apr 1955. 105p photos, drawing, diagrs, graphs (part fold), tables (1 fold). Order from OTS. $2.75. PB 131084

Significant improvements were made in the ultrasonic welding process, and successful welds were produced in gages of 1100 aluminum through .062", as well as in several other metals and alloys. Ultrasonic welds exhibited shear strength in the same order of magnitude as the materials themselves. No reduction in the strength of ultrasonically welded 1100 aluminum was evident after about 5000 hours exposure in each of two corrosion environments. Grain orientation in the materials to be welded was found not to be significant. Surface films adversely affected weld strength, and polished surfaces appeared to be more readily weldable than rough surfaces. It is indicated that the ultrasonic welding process has a potential for a wide range of metal joining problems. Ordnance Corps Project No. TB 4-31G-M58. Research report 55-30. Contract DA 36-034-ORD-1403.

METEOROLOGY AND CLIMATOLOGY

Astronomical measures and reductions. Final report for period 1 Jul - 31 Mar 1955 and summary report for period 1 Feb 1953 - 31 Mar 1955 under Contract N7 onr-48707, 1 Jul 1954 - 31 Mar 1955, by Jack T. Kent. Texas. Agricultural and Mechanical Research Foundation, College Station, Texas. Apr 1955. 1p. Order from LC. Mi $1.80, ph $1.80. PB 122249

Lists projects undertaken under this contract on astronomical measures and reductions. Project 75.

Examples of the field of motion and weather in the Western Central Pacific, by W.D. Ohmstede and G.A. Dean. California. University. Institute of Geophysics. Oahu Research Center, Oahu, Hawaiian Islands. May 1956. 24p maps, diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 123106

1. Meteorology - Observations - Pacific Ocean 2. Weather charts - Pacific Ocean 3. Contract AF 19(604)-546, Scientific report 13, Vol. VI.

Experiment in graphical forecasting based on two baroclinic models, by David W. Saxton. Chicago. University. Dept. of Meteorology, Chicago, Ill. Jul 1956. 29p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 124628

The effects of static stability and varying smoothing interval on the results of graphical integrations are discussed in connection with two prediction models developed by Estoque. Experimental forecasts of a major storm development indicated that the static stability pertaining to the standard atmosphere gives satisfactory results, and that a smoothing interval of about 1000 km is preferable. With such large smoothing interval the formula for recovering the height changes becomes much simplified. Contract AF 19(604)-1293, Scientific report 11. AF CRC TN 56-692.

Graphical integrations of a two-level model, by M.A. Estoque. Chicago. University. Dept. of Meteorology, Chicago, Ill. May 1956. 25p maps, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 124861

A prediction model representing a slight modification of a previous model (Estoque, in Journal of Meteorology, v. 13, p. 195-202. 1956) is presented. The prediction equations were integrated graphically to produce 24-hr 1000 and 500 mb forecasts for the month of January 1953. The results indicate that the method may be of considerable value in routine forecasting, particularly in regions where orographic influences are no great concern. Contract AF 19(604)-1293, Scientific report no. 10. AF CRC TN 56-495.

Summary of research progress for period 1 Jul 1954-30 Jun 1955 under Contract AF 61(514)-648-C, by B. Bolin. Stockholm. University. Institute of Meteorology, Stockholm, Sweden. Sep 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 124289

Research during this period covered forecasting for 48 and 72 hours with the barotropic model, further studies on the barotropic model, objective analysis, and 500 mb map analysis. Contract AF 61(514)-648C. AF CRC TN 55-1053.

Theory of dissociation and recombination processes in the ionosphere, by Morris Kline. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jun 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 125054

Summarizes work on the contract and lists publications resulting from it. Final report for the period Mar 1950 - Jun 1956 under Contract AF 19(122)-463. AF CRC TR 56-276.

Upper atmosphere research report no. XXVIII: Performance of rocket-borne 7.75-MC transmitting antenna in the ionosphere, by J. E. Jackson and A. D. Pickar. U.S. Naval Research Laboratory. May 1957. 21p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 125409

Appendix: Recent modifications in the rocket-borne instrumentation. 1. Antennas, Rocket - Performance 2. Rockets, Upper air - Equipment 3. NRL R 4940

Variation of natural radioactivity in the atmosphere with altitude. New Mexico Institute of Mining and Technology. Research and Development Division, Socorro, N.M. n.d. 4p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 128365

The vertical distribution of radon decay products in the lower atmosphere has been measured during airplane flights, using both negative-wire and precipitator methods of sample collection. Data taken by the wire method show a very gradual decrease in activity with height, with considerable activity found to exist at 16,000 ft. (msl). The precipitator results indicate an approximately linear decrease with altitude, with no appreciable activity found in samples collected by this method above about 11,000 ft. Measurements made at four ground stations in the altitude interval 4620 to 10,297 ft. gave similar results. The mean value for the coefficient of eddy diffusion in the atmosphere calculated from the precipitator data was 7 ± 4 m^2/sec for the plane flights and 11 ± 7 m^2/sec for the ground stations. Reprinted from American Geophysical Union. Transactions, v. 37, no. 2, April 1956. Technical report 9-NR. Contract N7 onr-405, Task 1, NR 082-013.

Vorticity changes in an east coastal cyclone, by Jerome Spar, Edwin L. Fisher, Ernest Paroczay and Roy E. Peterson. New York University. College of Engineering. Dept. of Meteorology and Oceanography, New York, N.Y. Jul 1955. 39p maps, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124100

Project SCUD, Progress report 2. 1. Cyclones - Structure 2. Cyclones - Dynamics 3. Vortex motion - Theory 4. Contract Nonr-285(09), Progress report 2.

MINERALS AND MINERAL PRODUCTS

Application of rate-process theory to breaking of glass, by F.B. Hodgdon, D.A. Stuart and F.E. Bjorklund. Utah. University. School of Mines and Mineral Industries, Salt Lake City, Utah. Aug 1948. 13p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 124116

An equation relating the ultimate strength of glass and porcelain to time under load is derived, using the rate-process theory of Eyring. The data of F.W. Preston (Journal of Applied Physics, 17, 189-195 (1946) are used to calculate the constants in the equation. The agreement between theoretical results and those obtained by Preston is excellent. AD 205079. Project title: Flow, creep and failure of solid materials. Contract N7 onr-451, T.O. I, NR 032-168, Technical report no. 3.

Frequency doubling and mixing in ferrites, by John E. Pippin. Harvard University. Gordon McKay Laboratory of Applied Physics, Cambridge, Mass. May 1956. 15p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 125041

A simple analysis of the frequency doubling and mixing effect in ferrites is presented in terms of applied magnetic fields and demagnetizing factors. Results are valid for sample shapes and sizes for which the concept of demagnetizing factors is valid. Contract AF 19 (604)-1084, Scientific report no. 2. AF CRC TN 56-369.

Polarization of thick ceramic specimens: $BaTiO_3$, by James McKee. Brush Development Co., Cleveland, O. Apr 1955. 8p diagrs, graphs, tables. Order from LC Mi $1.80, ph $1.80 PB 125114

Measured electromechanical coefficients obtained on barium titanate specimens whose dimension along the axis of polarization is greater than the lateral dimensions, are usually lower than those obtained on thinner specimens. This has generally been attributed to difficulty of obtaining uniform polarization. Recently, this problem was investigated systematically and the effects were traced to material inhomogeneities, non-uniformity of resistivity, and the density along the axis of poling. It has been shown that specimens pressed from laboratory- prepared barium titanate material polarize more uniformly than specimens prepared from commercially available $BaTiO_3$ powder. Contract Nonr - 1055(00), Technical report no. 5.

ORDNANCE AND ACCESSORIES

ONR symposium on detonation, 2d, Feb 9 - 11, 1955. Preprints. U.S. Office of Naval Research. 1955. 507f photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, enl pr $81.90. PB 128369

Contents: Charge preparation for precise detonation velocity studies, by Edward James, Jr. - Technique for the measurement of detonation velocity, by A.W. Campbell, M.E. Malin, T.J, Boyd, Jr. and J.A. Hull. - A microwave technique for measuring detonation velocity, by T.J. Boyd, Jr. and P. Fagan. - Measurement of detonation temperatures, by F.C. Gibson, M. Bowser, C.R. Summers, F.Scott, J.C. Cooper and C.M. Mason. - New cine microscope and its application to detonation phenomena, by J.S. Courtney-Pratt. - Measurement of density changes in gaseous detonations, by G.B. Kistiakowsky and P.H. Kydd. - Attainment of thermodynamic equilibrium in detonation waves, by G.B. Kistiakowsky and Walter G. Zinman. - On the structure of a detonation front, by W.R. Gilkerson and Norman Davidson. - High temperature thermodynamics and gaseous detonations in mixtures of cyanogen, oxygen, and nitrogen, by H.M. Peek and R.G. Thrap. - Detonation in gases at low pressure, by Arthur L. Bennett and Henry W. Wedaa. - Measurements on gaseous detonation waves, by J.A. Nicholls, R.B. Morrison, and R.E. Cullen. - Studies on gaseous detonation, by B. Greifer, F.C. Gibson and C.M. Mason. - Condensation shocks and weak detonations, by S.G. Reed, Jr. and W.H. Heybey. - Structure of a steady-state plane detonation wave with finite reaction rate, by John G. Kirkwood and William W. Wood. - Measurement of Chapman-Jougnet pressure for explosives, by W.E. Deal, Jr. - Measurement of the Chapman-Jougnet pressure and reaction zone length in a detonating high explosive, by Russell E. Duff and Edwin Houston. - Detonation zone in condensed explosives, by H. Dean Mallory and S.J. Jacobs. - Calculation of the detonation properties of solid explosives with the Kistiakowsky-Wilson equation of state, by W. Fickett and R.D. Cowan. - Solid-state model for detonations, by R.B. Parlin and J.C. Giddings. - Diameter effect in condensed explosives: The relation between velocity and radius of curvature of the detonation wave, by William W. Wood and John G. Kirkwood. - Detonation behavior of liquid TNT, by E.A. Igel and L.B. Seely, Jr. - Detonation in homogeneous explosives, by A.W. Campbell, M.E. Malin and T.E. Holland. - Particle size effects in one-and two-component explosives, by M.E. Malin, A.W. Campbell and C.W. Mautz. - Detonation wave fronts in ideal and non-ideal detonation, by Melvin A. Cook. - Determination of the reaction rate of sodium nitrate and the equation of state of 50/50 TNT-$NaNO_3$, by Melvin A. Cook and Wayne O. Ursenbach. - Decomposition of alpha-lead azide, by J.M. Groocock. - Detonation of azides by light, by J.S. Courtney-Pratt and G.T. Rogers. - Detonation in azides when the dimensions are comparable with the length of the reaction zone, by F.P. Bowden and A.C. McLaren. - Origin of luminosity in detonation flames, by Elwyn Jones. - Role of gas pockets in the propagation of low velocity detonation, by Owen A.J. Gurton. - Sensitiveness to detonation, by Elwyn Jones and Ian G. Cumming. - Initiation of military explosives by projectile impact, by J.M. Dewey.

Projectile shock on aircraft armor supports. Second partial report, by E.W. Kammer. U.S. Naval Research Laboratory. Mar 1945. 28p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 123360

Unclassified 15 Dec 1953. 1. Armor, Aircraft - Supports - Tests 2. Projectiles - Impact 3. Armor plate - Impact tests 4. NRL O 2496.

Tests of hypotheses involving desirability relations, by Irwin Miller and John E. Freund. Virginia Polytechnic Institute, Blacksburg, Va. Sep 1955. 44p graphs. Order from LC. Mi $3.30, ph $7.80. PB 124204

In a number of engineering and industrial situations it is necessary to specify the value of several parameters in order to describe a product adequately. Furthermore, estimation of these parameters may require that more than one variable be measured, the variables not necessarily being independent. It is the purpose of this report to discuss the problem of testing statistical hypotheses arising from such requirements. In the main, the discussions will have specific reference to a particular application arising in the evaluation of weapons accuracy, but other models will be indicated and, whenever possible, the results will be generalized sufficiently to include them. AD 71921. OOR project no. 1166. ORD project TB 2-0001(1166). Dept. of the Army project no. 599-01-004. Technical report 12 under Contract DA 36-034-ORD-1527 RD: Research in statistical problems: Multiple regression, measures of variation, mixed distributions, reliability, designs.

PACKING AND PACKAGING

Evaluation of five types of containers for jettisonable fiberglass fuel tanks, by T.B. Heebink. U.S. Forest Products Laboratory, Madison, Wis. May 1957. 15p photos, diagr, table. Order from OTS. 50 cents. PB 131187

Five types of containers for jettisonable fiberglass fuel tanks were evaluated and compared to determine whether savings could be made in tare weight and cubic displacement over the container now in use for aluminum tanks. Each of the containers was tested for resistance to rough handling by the edgewise drop, cornerwise drop, and pendulum impact tests. AD 118345. Project 7312, Task 73127. Covers work from Sep 1955 - Dec 1956 under Contract PO(33-600) 53-4023. AF WADC TR 56-647.

Evaluation of wirebound boxes as gas mask shipping containers (U), by Donald L. McReady. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. May 1956. 27p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 124639

The report describes investigation and evaluation undertaken to determine relative merit of craveneer and resawn wood wirebound boxes as compared with nailed wooden boxes currently specified for gas mask packaging. Complete test results are presented which show wirebound boxes equal in performance to nailed wooden boxes and superior in regard to weight and cube of pack. Project 4-91-06-001 and Project 4-91-06-002. CC CRL R 516.

Parachute instrument canister, Shaw and Estes model 327, by Marvin F. Clarke. Shaw and Estes. Engineering and Manufacturing Division, Dallas, Tex. Mar 1956. 43p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 124269

1. Canisters, Parachute - Design 2. Contract AF 19(604)-1492 3. AF CRC TR 56-270.

PERSONNEL APTITUDE TESTING

Criteria of executive effectiveness, by Marvin D. Dunnette, Dallis K. Perry, and Thomas A. Mahoney. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Officer Education Research Laboratory, Maxwell Air Force Base, Ala. Jun 1956. 56p graphs, tables. Order from LC. Order from LC. Mi $3.60, ph $9.30. PB 125231

Standards for judging criterion measures were reviewed. The criteria of effectiveness for individual executives which were selected for study included both organizational (group) effectiveness criteria and individual effectiveness criteria. Depot ratings were analyzed and four individual effectiveness measures were developed and analyzed, namely, total time in present grade, overall promotion rate index, officer effectiveness ratings, and an alternation ranking technique for superior, peer, and subordinate ratings. Project 7730, Task 77356. Covers period Sep 1952 - Sep 1954 under Contract AF 18(600)-320. AF PTRC TN 56-73.

Development of the written evaluation of mechanics' proficiency (WEMP) measure for B-50 aircraft, by Joseph E. Morsh. U.S. Air Force. Air Research and Development Command. Air Forc Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1956. 30p tables. Order from LC. Mi $2.70, ph $4.80. PB 125229

Personnel Research Institute of Western Reserve University, with Human Factors Operational Research Laboratory and later Air Force Personnel and Training Research Center as the monitoring agency, initiated construction of a series of WEMPs beginning with B-50. For each WEMP a test outline was set up. Subject matter experts were selected and trained to work with test technicians. Items were tried out. Item analyses were performed in terms of difficulty and discrimination indexes. An operational form was constructed and administered to appropriate groups of Air Force personnel. Reliabilities and validities (in terms of supervisor ratings) of the area subtests and of the total test were determined. Conversion tables were constructed so that WEMP raw scores may be converted to stanines. Project 7960, Task 79500. Contract AF 18(600)-82. AF PTRC TN 56-75.

Experimental assembly of B-29 crews by self-selection procedures: A description and validation of the method, by Seymour Rosenberg and Thornton B. Roby. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Center. Crew Research Laboratory, Randolph Air Force Base, Randolph Field, Texas. Aug 1956. 44p tables. Order from LC. Mi $3.30, ph $7.80. PB 124765

The present report first described a more successful attempt to test one variant of self-selection method for aircrew assembly in an operational situation. This report contains a description of the techniques and materials employed in the study and analyses of the obtained pair-scores, giving some indication of their prima facie suitability for assembly purposes. Second, the report deals with the validity of selection scores as an assembly method. AD 098879. AF PTRC TN 56-104.

Operational suitability test of graduates of TTAF course no. AB43131C, apprentice aircraft mechanic, jet, one engine. U.S. Air Force. Air Proving Ground Command, Eglin Air Force Base, Fla. Aug 1955. 31p tables. Order from LC. Mi $3.00, ph $6.30. PB 124107

Project: APG/CSC/578-A, Final report. AD 71832.

Predicting success in certain aircraft maintenance specialties by means of manipulative tests, by Edwin A. Fleishman. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. Sep 1955. 37p drawings, diagrs, tables. Order from LC. Mi $3.00, ph $6.30. PB 125118

Apparatus tests of motor skills have proved their value in predicting success for certain aircrew jobs and have been an integral part of the Aircrew Classification Battery. This report describes an exploratory evaluation of the utility of certain manipulative tests for predicting success in technical specialties. It is the first in a series of studies concerned with the utility of certain simplified apparatus tests and printed manipulative tests as possible additions to the printed Airman Classification Battery. AF PTRC TN 55-23. Project 7709, Task no. 77010.

Procedure for developing job-knowledge tests, by Eugene L. Gaier, Louis L. McQuitty and Charles N. Cherry. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Sep 1956. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 124764

The degree of significance of items in differentiating between groups of subjects at various levels of training and experience was found to be related to the parts of the airplane with which the items are concerned. Job knowledge taught in various phases of a course was differentially related to both the parts of an airplane and to the significance of items differentiating subjects at various levels of training and experience. Subjects selected as representative of different levels of training and experience did not show significant differences in aptitude as measured by selected indexes from the Airman Classification Battery. Accordingly, the differentiating power of the job-knowledge items is here attributed to differential learning and forgetting rather than to selective attrition. AD 098888. Project 7700, Task 77016. Contract AF 33(038)-25726, Task A. AF PTRC TN 56-113.

Recommendations for typewriting training, by Leonard J. West. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Maintenance Laboratory, Lowry Air Force Base, Denver, Colo. Jun 1957. 23p. Order from OTS. 75 cents. PB 131224

Specific recommendations based on the research evidence were abstracted from a more comprehensive review of research in typewriting learning. In order to provide a convenient reference document for the instructor and his supervisor, the recommendations are in the form of 71 brief, numbered paragraphs organized under 11 major headings which typewriting instructors conventionally use to describe the various aspects of instruction. Project no. 7714, Task no. 77257. AD 126399. AF PTRC TN 57-68.

PHOTOGRAPHIC AND OPTICAL GOODS

Recording of audience reactions by infrared photography, by L.P. Greenhill. Pennsylvania State University, University Park, Pa. Sep 1955. 13p photos. Order from LC. Mi $2.40, ph $3.30. PB 124147

With the new fast films now available it is possible to make economical photographic recordings of audience reactions under low light levels by employing the memo-motion filing technique and a simple lighting system. This technique records photographs at the rate of one per second, a frequency which is sufficiently fast to record most human activities, and which at the same time is economical in the use of recording film. SPECDEVEN Project 20-E-4; Instructional Film Research Program. Contract N6 onr-269. SDC TR 269-7-56.

Standard indexing system for aerial and radar photography. U.S. Air Force. Aeronautical Chart and Information Center. Photographic Records and Services Division. Jan 1955. 17p photos, diagr, maps (1 col.). Order from LC. Mi $2.40, ph $3.30. PB 128366

The report presents a brief history of aerial photography and describes the new indexing system put into operation in the U.S. Air Force by official regulation on a world-wide basis. Map accompanied by 3 overlay sheets. Color will not reproduce. AF ACIC TR 65.

PHYSICS

General

Analytical methods for determining specific damping energy considering stress distribution, by E.R. Podnieks and B.J. Lazan. Minnesota. University, Minneapolis, Minn. Jun 1957. 42p drawing,

graphs, table. Order from OTS. $1.25.
PB 131250

Various energy and energy ration units for expressing the damping properties of materials are discussed. Specific damping energy (in-lb/cu in/cycle) is proposed as the most useful unit for comparing materials and performing engineering calculations. Analytical methods are presented for coverting the total or average damping energy of a specimen to its specific damping. The role of the volume-stress function in this analysis is discussed in general and specific cases are illustrated. Additional factors involved in converting such energy ratio units as logarithmic decrement are analyzed. Data on the dimensionless damping and strain energy integrals are included for a range of conditions to facilitate data conversion. Caution is urged in interpreting damping data in which stress distribution and other factors, analyzed in this report, are not fully considered. AD 130777. Project 7360, Task 73604. Covers work from Jul 1953 - Feb 1956 under Contract AF 33(616)-2803. AF WADC TR 56-44.

Axially symmetric mixing of two laminar incompressible streams, II, by T.P. Torda. Illinois. University. Dept. of Aeronautical Engineering, Urbana, Ill. Mar 1956. 34p graphs. Order from OTS. $1.00. PB 121230

The analytical investigation of laminar, incompressible, constant pressure mixing of axially symmetric jets is presented. The effect of non-uniform velocity distribution of the beginning of the mixing, caused by the boundary layers at both sides of the wall separating the streams before mixing is taken into account. The boundaries of the mixing region and the velocity profiles are evaluated by the use of the Von Karman integral concept. A numerical example is given to illustrate the method of solution. Part I is Technical report M-TR-5. AF WADC TN 55-39.

Dynamic elastic properties of solids. Final report, by T.R. Cuykendall and H.S. Sack. Cornell University. Dept. of Engineering Physics, Ithaca, N.Y. Nov 1955. 115p drawings, diagrs, graphs, photos, table. Order from OTS. $3.00.
PB 121701

Preparation of single crystals of zinc, copper, and aluminum together with study of internal friction and Young's Modulus in these materials. Studies of the internal friction of elastomers and plastics, including polyisobutylene, rubbers, polymethylacrylate, and Teflon. Summarizes work from 1947 to 1953. Contract N6 ori-91, Task 2, NR 019-303.

Elasto-plastic bending of circular and annular plates, by V.V. Sokolovsky. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Nov 1955. 36p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30.
PB 124599

This report contains a translation of chapter XIV of V.V. Sokolovsky's "Theory of Plasticity" (2nd edition, Moscow 1950). Being based on stress-strain relations of the total strain type (Eqs. 14.4), Sokolovsky's treatment of the bending of elastic plastic plates is subject to the general criticism of stress-strain relations of this type. Despite this fundamental weakness, Sokolovsky's work has considerable mathematical interest in view of recent and current American work in this field. Contract Nonr-562(10), NR 064-406. GDAM TR 3.

Experimental research on plastic deformation. Proposal to the Office of Naval Research for extension of Contract N6 ori-071(54) which expires 31 Aug 1955, by J.S. Koehler and F. Seitz. Illinois. University. Dept. of Physics, Urbana, Ill. Aug 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 122946

Covers proposed program for research on dislocation production on various glide systems, distinction between ductile and brittle materials, twinning, damping and electric constants.

Fourier transform method for the treatment of the problem of the reflection of radiation from irregular surfaces, by William C. Meecham. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Nov 1955. 27p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 125120

A method is presented which can be used for the calculation of the distribution of energy reflected from irregular surfaces. The formulation is useful for the first boundary value problem and can be used in either two-or three-dimensional problems with any given incident field. The solution is reduced to quadrature with negligible error when the average square of the slope of the reflecting surface is small and when the length of the incident radiation is not small compared with the displacement of the surface from its average value. A numerical example is worked, and is compared with experiment and with a method due to Rayleigh. Contract N6onr-23221, NR 385-203. MU ERI Proj 1936-6-T.

Heat transfer in a laminar compressible boundary layer on a porous flat plate with variable fluid injection, by S.W. Yuan and N. Ness. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Sep 1950. 19p diagr, graphs. Order from OTS. 50 cents.
PB 131150

A theoretical investigation of the heat transfer in a laminar compressible boundary layer on a partially porous flat plate with variable fluid injection (trapezoidal and bilinear types) is made. The method of iteration and graphical integration is used to obtain the solution of the boundary layer equation. The relation between wall temperature and the rate of coolant injection is calculated for three different injection profiles (trapezoidal, bilinear, and uni-

form). The results indicate that for equal quantities of coolant injected, the variable injection cases are slightly more efficient than is the uniform injection case. Project Squid, Technical memorandum PIB-15-M. Contract N6 ori-98, T.O. II, NR 220-039, Phase 3. PIB-15-M.

Impact pressure and temperature profiles in a non-isothermal jet discharging into a duct, by R.D. Danielson and Arnold Kivnik. Illinois. University, Urbana, Ill. Sep 1953. 4p. Order from LC. Mi $1.80, ph $1.80. PB 123591

Earlier work with air jets discharging into ducts showed the existence of velocity profiles near the duct walls which seemed abnormal. The purpose of this study was to determine the effect of a tapered entrance section on the velocity profiles in the duct. Issued in conjunction with the final report on the program "Mixing of fluid streams". Contract N6 ori-071(11). ILU TM 3.

Influence of resolving power on measurement of correlations and spectra of random fields, by Mahinder S. Uberoi and Leslie S.G. Kovasznay. Johns Hopkins University, Baltimore, Md. n.d. 37p graphs. Order from LC. Mi $3.60, ph $6.30. PB 123583

Discusses application to turbulence measurement by hot-wire anemometer, and application to scalar random (temperature or density) fields, and calculates hot-wire length effect for some simple velocity and temperature spectra. Project Squid, Technical report 30. Contract N6 onr-243, T.O. 20, NR 220-088.

Interaction of an acoustic wave and an elastic spherical shell, by Pauline Mann. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Feb 1953. 35p diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 123588

The problem considered is that of a plane pressure wave impinging on a thin spherical shell. The paper deals with the linearized theory of wave propagation in a compressible fluid, and with small deflections of the shell. AD 2974. Contract N7 onr-35810, NR 360-003. GDAM B 11-11/34. GDAM TR 11.

Maximum likelihood estimation of restricted parameters, by H.D. Brunk. Missouri. University. Dept. of Mathematics, Columbia, Mo. Sep 1956. 28p. Order from LC. Mi $2.70, ph $4.80. PB 124143

A mathematical study of maximum likelihood estimation for independent random sampling from a finite number of populations belonging to exponential families, when the parameter point is known to lie in a proper subset of its "natural range". AD 96049. Contract AF 18(600)-1108. AF OSR TN 56-391.

Measurement of soil moisture by heat diffusion, by William M. Aldous, Warren L. Lawton and Robert C. Mainfort. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1952. 19p photos, drawings, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 127843

1. Soils - Moisture content - Measurement - Methods 2. CAA TDR 165

Mechanization techniques for digitalized logic. ACF Industries, Inc. Research Dept. Avion Division, Alexandria, Va. Aug 1956. 38p tables. Order from LC. Mi $3.00, ph $6.30. PB 124719

This report investigates the problems connected with mechanization of various logical operations particularly with respect to expressions having a fall disjunctive normal form. In Section I, various common logical operations with the view to showing the corresponding manipulations of the binary designation numbers are investigated. In Section II, the problem of reducing the often excessive length of these numbers is discussed. Scientific report for the period Jun 1, 1956 - Aug 31, 1956 under Contract AF 19(604)-1582. AD 98794. For earlier reports see PB 123414 and 123754. AF CRC TN 56-593.

Multi-stage statistical decision procedures, by M.A. Girshick, S. Karlin and H.L. Royden. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Sep 1955. 30p. Order from LC. Mi $2.70, ph $4.80. PB 123947

The present paper is devoted to the problem of prescribing rules which tell how the single-stage decision procedures d_k should interlock with one another so as to give a minimal complete class of decision procedures for the multi-stage statistical decision problem. AD 72772. Contract N6 onr-25140, NR 342-022. SU AMSL TR 30.

Note on autonomous second order non-linear differential equations, by W.R. Utz. Missouri. University. Dept. of Mathematics, Columbia, Mo. Sep 1956. 13p. Order from LC. Mi $2.40, ph $3.30. PB 124630

AD 96230. 1. Equations, Differential - Non-linear 2. Contract AF 18(600)-1108 3. AF OSR TN 56-420.

On a Fredholm equation in diffraction theory, by Irving J. Epstein. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Oct 1956. 36p. Order from LC. Mi $3.00, ph $6.30. PB 125134

The problem of diffraction of a plane wave by a circular aperture in a plane screen has been treated by Levine and Schwinger, who reduced it to a system of infinitely many linear equations. This system has been modified by Bouwkamp, and Magnus has proved that Bouwkamp's system is equivalent to a Fredholm integral equation of the second kind. Their asymptotic behavior for $a \to \infty$ is investigated and explicit expressions for the first few terms are stated in this report. AD 110302. Contract AF 18 (600)-367. AF OSR TN 56-489. NYU RR-BR-20.

On integrating factors and on conformal mappings, by Philip Hartman. Johns Hopkins University. Dept. of Mathematics, Baltimore, Md. Oct 1956. 32p. Order from LC. Mi $3.00, ph $6.30. PB 124219

The main results of this paper deal with the existence of (local) integrating factors "for a linear differential form . Part I deals with the case in which $1/T$ is an "integrating factors" for ω. Part II considers the complex case whose solution depends on an elliptic system of partial differential equations. The appendix considers a related problem on indefinite forms in the theory of surfaces. This problem has applications in the theory of the introduction of asymptotic lines or lines of curvature as coordinate curves. AD 97359. Contract AF 18 (603)-41, Technical report no. 1. AF OSR TN 56-475.

On isolated singularities of solutions of second order elliptic differential equations, by D. Gilbarg and James Serrin. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jan 1956. 44p. Order from LC. Mi $ 3.30, ph $7.80. PB 125171

This paper investigates the local behavior of solutions of linear elliptic partial differential equations in $n \geq 2$ independent variables. The topics include an extended form of the maximum principle for domains containing a singular point, the asymptotic and limit behavior of solutions, and the characterization of fundamental solutions. Contract Nonr-225(11), NR 041-086. SU AMSL TR 48.

On renewal theory, counter problems, and quasi-Poisson processes, by Walter L. Smith. North Carolina. University. Institute of Statistics, Chapel Hill, N.C. Jan 1956. 26p. Order from LC. Mi $2.70, ph $4.80. PB 123982

AD 87064. Institute of Statistics mimeograph series no. 144. 1. Mathematical equations and solutions 2. Probability - Theory 3. Stochastic methods 4. Poisson's ratio 5. Contract AF 18(600)-458 6. AF OSR TN 56-191

On supersonic rotational flow behind strong shock waves. II: Flow past ogives of revolution, by Abraham Kogan. Technion Research and Development Foundation, Ltd., Haifa, Israel. Aug 1956. 39p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 124629

A method of successive approximations to the ideal flow around airfoils and ogives of revolution at high suspersonic Mach numbers is developed, based on the concept of Crocco's Stream Function. In a previous report the flow around airfoils has been treated. Taking the undisturbed flow as a starting point, a second approximation to the flow in the whole region surrounding the airfoil has been derived and the results for velocity and pressure distribution at the airfoil surface were compared with the corresponding expressions obtained by potential flow theory. AD 94853. Technical report summarizing the research progress for the period of 15 Jan - 15 Jul 1956 under Contract AF 61(514)-870. OSR TN 56-316.

On the efficiency of certain tests of 2 x 2 tables, by John H. MacKay. North Carolina. University, Chapel Hill, N.C. Apr 1956. 127p graph, tables. Order from LC. Mi $6.30, ph $19.80. PB 123080

Discusses choices between two binomial populations when the sample sizes are equal and the loss function is symmetrical; asymptotic solutions as the distance between the alternatives tends to zero; asymptotic efficiency of Fisher-Tocher tests and the approximate Chi square test; asymptotic solutions as the error probabilities tend to zero. AD 87065. Institute of Statistics Mimeograph series no. 146. Contract AF 18(600)-458. AF OSR TN 56-192.

On the use of the Kirchhoff approximation for the solution of reflection problems, by William C. Meecham. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Nov 1955. 16p diagr. Order from LC. Mi $2.40, ph $3.30. PB 125121

1. Kirchhoff's law 2. Approximate computations 3. Radiation - Reflection - Theory 4. Equations, Integral 5. NR 385-203 6. MU ERI Proj. 1936-4-T 7. Contract N 6 onr-23221, NR 385-203

Operational calculus for the Mellin transform, by Gordon Latta. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford. Calif. Nov 1955. 28p. Order from LC. Mi $ 2.70, ph $ 4.80. PB 125071

There exist many formal operational devices whose use gives a systematic method of obtaining solutions to problems in analysis. The object of this paper is the presentation of one such operational device, illustrating a few applications. No attempt has been made to exhaust the literature on this topic. Contract Nonr-225 (11), NR 041-086. SU AMSL TR 44.

Plane continuum no two of whose non-degenerate subcontinua are homeomorphic, by R. D. Anderson and Gustave Choquet. Princeton University. Institute for Advanced Study, Princeton, N.J. Jul 1956. 11p. Order from LC. Mi $2.40, ph $3.30. PB 124231

The primary purpose of this paper is to show that in the plane there exists a continuum no two of whose non-degenerate subcontinua are homeomorphic. It gives detailed constructive proof of the existance of such continuum M which does not separate the plane. AD 94-851. Project R-354-10-60. Presented to the American Mathematical Society, 27 Dec 1955. Contract AF 18(600)-1109 (Supplemental agreement no. 2 (55-518). AF OSR TN 56-315.

Process of retraction, by Lamberto Cesari. Purdue University. Dept. of Mathematics, Lafayette, Ind. Dec 1955. 15p. Order from LC. Mi $2.40, ph $3.30. PB 124852

PRF 1203. Project no. 17501 (Analytical theory of continuous transformations). 1. Transformations (Mathematics) 2. Contract AF 18(600)-1484, Technical note 1 3. AF OSR TN 56-19

Properties of contours, by Lamberto Cesari. Purdue University. Dept. of Mathematics, Lafayette, Ind. Dec 1955. 43p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 124851

PRF 1203. Project no. 17501 (Analytical theory of continuous transformations). 1. Transformations (Mathematics) 2. Plotting, Contour 3. Contract AF 18(600)-1484, Technical note 2 4. AF OSR TN 56-20

Quarterly report Apr - Jun 1956. Massachusetts Institute of Technology. Acoustics Laboratory, Cambridge, Mass. Jun 1956. 44p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124658

Brief statements are given on the progress of each of 21 research items conducted during April - June 1956. Definitive results are reported in scientific journals.

Relation of chemical constitution to the wetting and spreading of liquids on solids, by W. A. Zisman. U.S. Naval Research Laboratory. May 1957. 14p diagr, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 125376

Wettability is defined by the contact angle θ of the liquid and solid, and the cosine of this angle is a valuable wettability parameter. Systematic investigations of the variation in cos θ with the surface tension γ_{LV} of a large variety of liquids on well-defined, smooth, polymeric solids revealed linear relations between cos θ and γ_{LV} for each homologous series of liquids; this led to the useful concept of the critical surface tension γ_c of each such series. A close correlation has been discovered between γ_c and the nature of the surface constituents of organic solids. Remarkable changes in wettability of various high-energy surfaces (such as hard high-melting solids) result from the adsorption of a monomolecular organic film. A complete elucidation of the various mechanisms involved has resulted. It has been possible to predict wetting and spreading properties of liquids on solids at ordinary temperatures from knowledge of the constitution and packing of the molecules in the surface of the solid. Unquestionably, atoms more than a few atom diameters below the surface have little influence unless a large permanent dipole or ion is included in the molecular structure of the solid in that locality. The results of this investigation have widespread application in research and technology. NRL R 4932.

Smoothing by orthogonal polynomials to obtain velocity data from position data, by Charles L. Carroll, Jr. U.S. Air Force. Air Research and Development Command. Missile Test Center, Patrick Air Force Base, Fla. Oct 1956. 31p tables. Order from LC. Mi $3.00, ph $6.30. PB 124732

A procedure is presented for obtaining velocity data from position data. The position data are smoothed using orthogonal polynomial techniques introduced by Charles Jordan and R. A. Fischer. The smoothing procedure is a moving arc type for an arbitrary spread of points N. Estimates of the variance of the smooth position data and velocity data are given. AD 96633. RCA data reduction technical report no. 30. AF MTC TN 56-79.

Some observations about inverse limit sets, by R. D. Anderson and Gustave Choquet. Princeton University. Institute for Advanced Study, Princeton, N. N.J. Jul 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 124232

In anticipation of the methods of proof of the paper "A plane continuum no two of whose non-degenerate subcontinua are homeomorphic", (PB 124231), two theorems about inverse limits are proved. One gives sufficiency conditions that an inverse limit be embeddable in a compact space S. The second asserts that the mapping (induced by the sequence of mappings) from the inverse limit into any space of the sequence is atomic provided each mapping of the sequence is atomic. A mapping f of compact X into Y is said to be atomic if f is monotone and for every continuum K c X for which f(K) is non-degenerate $K = f^{-1}f(K)$. AD 94-849. Project R-354-10-60. Contract AF 18(600)-1109 (Supplemental agreement no. 2 (55-518)). AF OSR TN 56-313.

Sonic method of measuring Young's modulus of elasticity at high temperature, by W. B. Crandall and C. A. Bryant. Alfred University, Alfred, N.Y. Dec 1953. 14p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 123589

A method of measuring Young's modulus of elasticity employing a sonic technique is described. This method has the advantage of being usable over a fairly wide range of temperatures, is non-destructive, and is capable of reproducing values to within ±1%. An audio frequency generator is used to drive a long thin bar suspended by a platinum wire from a speaker cone. Another wire attached to a variable reluctance pick-up needle suspends the bar at the other end. An oscilloscope is used to detect the resonant frequency of the bar from the pick-up device. A simple relationship reported by Pickett is used to relate the resonant frequency of the bar to Young's modulus. Contract N6-ORI 143, NR-032-022.

Study of a family of Laves-type intermediate phases. Quarterly progress report no. 1 for the period 10 May 1953 - 31 May 1953 under Contract AF 18(600)-642, by R. Elliott. Armour Research Foundation, Chicago, Ill. Jun 1953. 10p table. Order from LC. Mi $1.80, ph $1.80. PB 123472

AD 13649. 1. Metals - Crystal structure 2. Alloys, Ternary - Structure 3. Alloys, Binary - Structure 4. Metals - Transformation 5. Contract AF 18(600)-642, Quarterly progress report 1 6. AF OSR TN 54-247 7. ARF Proj B-0537

Tables of the sine and cosine in decimal and octal at increments of 1/210 of a quadrant, by R.H. Urbano. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Computer Laboratory, Bedford, Mass. Mar 1956. 20p tables. Order from LC. Mi $2.40, ph $3.30. PB 124558

1. Tables, Mathematical 2. AF CRC TR 56-108

Temperaturverteilung in einem gleichstromdurchflossenen langen metallzylinder mit kreisformigen querschnitt (Temperature distribution in an equally divided cross section of a long circular metal cylinder with direct current), by Stig Ekelöf. Chalmers Institute of Technology, Gothenburg, Sweden. 1955. 41p photos, diagrs, graphs, tables. (Text in German.) Order from LC. Mi $3.30, ph $7.80. PB 124925

The space time temperature distribution was studied in a very long straight circular cylindrical metal conductor, with DC current at constant voltage connected to it. The problem is formulated mathematically and the earlier known solution for constant material is examined more closely. It is further shown that the solution for material depending on temperature can be obtained by means of an automatic integration device. Chalmers Tekniska Hogskolan. Handlingar nr. 167. Electrical Engineering Series vol. 6, no. 10. Acta polytechnica 183.

Torque on an infinite strip exposed to plane sound waves, by Harold Levine. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jan 1956. 36p diagr. Order from LC. Mi $3.00, ph $6.30. PB 125174

The mean torque on an infinite fixed strip due to plane harmonic sound waves is calculated, employing simple accoustical theory as a basis and neglecting viscosity. Contract Nonr-225(11), NR-041-086. SU AMSL TR 49.

Nuclear

Applications on infinite plane theory of gamma scattering (u), by Ralph Fullwood, Sam Holland Richard Liboff and Paul Grant. U.S. Chemical Corps. Radiological Laboratories, Army Chemical Center, Md. May 1956. 24p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 125083

Work is reported on the following problems in the theory of gamma scattering from an infinite plane source: the dose rate as a function of energy at 3 ft. above the plane, the dose rate as a function of height above the plane for source energies of 1 and 2.76 mev, the dose rate as a function of the radius of contamination for 3 source energies (1, 2, and 3 mev) and the dose rate received 3 ft. below the surface in a hole 3 ft. in diameter for a source of 1 mev. Project 4-12-10-007-04. CC CRL R 502.

Effects of nuclear irradiation on magnetic properties of core materials, by R.S. Sery, R.E. Fischell and D.I. Gordon. U.S. Naval Ordnance Laboratory, White Oak, Md. Dec 1956. 45p photos, graphs, tables. Order from OTS. $1.25. PB 131014

An investigation was made of radiation effects on the magnetic characteristics of seven representative core materials: 1. A transformer material: 3.5% silicon iron: 2. A magnetic amplifier material: Orthonol; 3. A very high permeability material: 5-79 Mo Permalloy; 4. A high saturation flux density material: 2 V Permendur; 5. A non-strategic alloy: 16 Alfenol; 6. A typical ferrite: 50-50 nickel-ferrite; 7. A typical powder core: 2-81 Mo Permalloy The materials were irradiated in the Brookhaven reactor for 17 days at a neutron flux of 1.8×10^{12} neutrons per square centimeter per second. The total integrated flux for this period was 2.7×10^{18} neutrons per square centimeter. Magnetic measurements were made before, during, and after irradiation. A paper based on this report was presented at the Conference on Magnetism and Magnetic Materials in Boston on 17 Oct 1956. NAVORD 4381.

Inelastic scattering of 2.6-mev neutrons from Fe^{54}, Fe^{56}, Fe^{57}, W^{182}, and W^{184}, by P. Shapiro and R.W. Higgs. U.S. Naval Research Laboratory. Jun 1957. 20p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125378

Gamma rays following inelastic scattering of 2.6-Mev d-d neutrons from isotopically enriched samples of Fe^{54}, Fe^{57}, W^{182}, W^{184}, and from normal iron and tungsten have been observed in a NaI scintillation spectrometer using the He^3 coincidence technique. The observed gamma rays are listed and are assigned to particular isotopes of the elements studied. Decay schemes are proposed for Fe^{54}, Fe^{56}, and Fe^{57}. Determination of the photopeak efficiency of a NaI summing spectrometer is discussed. NRL R 4937.

Investigation of X-radiation hazards, measurements, and shielding of high power RF transmitting tubes, by Philip Order. U.S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Jan 1957. 31p diagrs, graphs, tables. Order from OTS. $1.00. PB 121955

The permissible dosage for continuous exposure to X-radiation and the methods of measuring such radiation near RF generating equipment are investigated. It is found that various agencies concerned with the problem disagree about the value for permissible dosage; however, the value of the National Bureau of Standards is adopted. Certain radiation instruments are found to be affected by RF, and those methods of measurement unaffected by RF are described. AD 97713. Project no. 4585. Includes Addendum to report. Appendix: Electrical tests on radiation survey meter. AF RADC TN 56-278.

Lectures on the dispersion relations in meson field theory, by R.L. Arnowitt. U.S. Naval Research Laboratory. May 1957. 82p graphs. Order from LC. Mi $4.80, ph $13.80. PB 125812

These notes are based on a series of lectures on dispersion theory given by Professor R. Arnowitt in the Nucleonics Division of the U.S. Naval Research Laboratory during the summer of 1956. The notes begin with the derivation of an adequate representation for the S matrix in meson-nucleon scattering, and continue with the definition of a retarded function M which is equal to the S matrix in the physical domain. The causality condition is then imposed. Finally, the dispersion relations are derived, and an application is made to experimental data on pion nucleon scattering. Notes prepared by D.J. Kleitman. NRL R 4941.

Measurement of radon gas in cylindrical ionization chambers, by Edward A. Burke. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1957. 11p. Order from OTS. 50 cents. PB 131186

Three of the fundamental problems encountered in the measurement of radon gas using cylindrical ionization chambers are discussed and solutions presented. These are: variation of ionization current with short half-life radon daughters, effect of dielectric absorption, and calibration of the ionization chamber. AD 118062. Project 7360, Task 73607. Covers work from Feb-Mar 1956. AF WADC TR 56-548.

Measurement of soil moisture and density by neutron and gamma ray scattering, by D.J. Belcher, T.R. Cuykendall and H.S. Sack. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1950. 22p photos, drawings, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 127854

1. Soils - Moisture content - Measurement 2. Neutrons - Scattering - Measurement 3. Gamma rays - Scattering - Measurement 4. CAA TDR 127

New tables of Mie scattering functions for spherical particles. Part 2: Values of amplitude functions a_m and b_m for refractive index n = 1.40 and for size parameters a = 0(0.1)30, by Rudolf Penndorf and Bernice Goldberg. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Bedford, Mass. Mar 1956. 239p tables. Order from OTS. $5.50. PB 131172

Tables are given for the real and imaginary parts of the complex amplitude functions a_m and b_m. They are the basic values for the computation of Mie scattering coefficients. The computations have been carried out with the IBM 701 electronic data processing machine. AD 98768. For Parts 5-6 see PB 114180 and 121905. AF GRD P 45, Part 2. AF CRC TR 56-204(2).

Some applications of scattering theory, by A.H. Aitken. U.S. Naval Research Laboratory. Jul 1957. 41p. Order from LC. Mi $3.30, ph $7.80. PB 125895

The equations for the scattering of a particle by a system possessing internal degrees of freedom are set up and applications are made to nuclear and magnetic scattering of low energy neutrons. NRL R 4962.

Tables of kinematics of Σ^+ hyperon decays, by R.G. Glasser and G.A. Snow. U.S. Naval Research Laboratory. Jun 1957. 37p tables. Order from LC. Mi $3.00, ph $6.30. PB 125634

Tables have been prepared of the transformations from the laboratory system to the rest system for the Σ^+ hyperon velocities (in units of the velocity of light) from 0.05 to 0.50 in intervals of 0.05. NRL R 4953.

PHYSIOLOGY

Body dimension changes during basic training, by H.C. Meyers, Jr., G.S. Daniels, Edmund Churchill and Norma S. Roelke. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, and Antioch College, Yellow Springs, Ohio. Dec 1956. 34p graph, tables. Order from OTS. $1.00. PB 131183

Changes during basic training in the body dimensions of approximately two hundred male and a similar number of female airmen were measured. Eight circumferences, weight, and stature were measured weekly during each of the first four weeks and during the eighth and twelfth weeks of training. The resulting data were analyzed in the hope that changes in proper clothing size which occur during the training period could be predicted in advance. AD 97216. Material compiled under Contract AF 18(600)-30. Contract AF 33(616)-3841. AF WADC TR 56-458.

Cutaneous toxicity evalaution of Air Force development materials. Part I, by Morris V. Shelanski and Charles Josephs. Industrial Toxicology Laboratory, Inc., Philiadelphia, Pa. Dec 1956. 58p tables. Order from OTS. $1.50. PB 131199

Two hydraulic fluids, seven synthetic oils, seven experimental impregnated cloths, five control cloths, three engine oils and one high temperature grease were studied via the prophetic patch test method on laboratory animals and volunteer human subjects to determine the primary irritant effect and sensitization index of these materials. The fabrics were impregnated with the following materials: laurylester of pentachlorophenol, approximately 2.5% by weight; Kuprate Cu 8 and water repellent, approximately 0.13% Cu.; Kuprate Cu 8 and water repellent, approximately 0.22% Cu; Pyroset D.O., approximately 15-20% solids; 17% tetrakis (hydroxymethyl) phosphonium chloride (THPC) a reaction product of formaldehyde and phosphonium chloride. Chem. formula $(HOCH_2)_4$ PCL; 21% THPC and phosphonitrilic chloride (PNC); 22% THPC and Bromoformtriallyl phosphate adduct (BAP) ("22 % THPC and BAP" contains 64% THPC and 36% BAP). AD 118233. Project 7159, Task 71802. Appendix A. - Rabbit skin test results. Appendix B. - Human patch test results. Contract AF 33(616)-3049. AF WADC TR 56-626.

Immunochemical and blood chemistry studies of "cold adapted" animals, by G. Bonar Sutherland and Dan H. Campbell. U.S. Air Force. Arctic Aeromedical Laboratory, Ladd Air Force Base, Alaska. Sep 1956. 37p photos, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124783

Section I of this report summarizes the pertinent results of the work on the Arctic squirrels, Section II deals with the work on "cold adapted" rabbits, and Section III is a report on a new method for the detection and isolation of antibody which was developed during this program. AF AAL Project 8-7951.

Quartermaster human engineering handbook series II: Dimensions of the upper limit of gloved hand size, by John L. Kobrick. U.S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Dec 1956. 198p photos. Order from OTS. $5.00. PB 131192

This report presents human enginnering information on the hand size of the soldier wearing various ensembles of Quartermaster protective handwear. It is intended for use as a handbook by engineers for establishing size and space allowances in the design and sizing of hand-operated equipment. The criterion employed is the bare hand size that is equal to or bigger than the hand size of 95% of the Army personnel. The information is presented in pictorial form with index scales, so that dimensions can be measured on the pictures and referred to the index scale to establish actual size. Project reference: 7-83-01-004. QMC EP TR 41.

PSYCHOLOGY

Adaptability screening of flying personnel. Situational and personal factors in conforming behavior, by Robert R. Blake and Harry Helson. U.S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Sep 1956. 59p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124763

This series of investigations explores personality variables as these interact with selected situational variables to produce conformity behavior in varying degrees. The first paper evaluates the Simulated Group Technic used throughout the subsequent studies, comparing judgments made privately with those made in the simulated and in face-to-face groups. The simulated group is shown to be an effective technic and equivalent in effect to the face-to-face group. AF SAM R 56-86.

Behavior in groups: Test of a proposed theory of leadership, by Bernard M. Bass and Eugene L. Gaier. Louisiana State University. Dept. of Psychology, Baton Rouge, La. Nov 1955. 20p. Order from LC. Mi $2.40, ph $3.30. PB 125119

This report covers the first year of a project initiated to test hypotheses generated by a theory of leadership. The theory is an attempt to account for

the present available evidence concerning the interaction of situational and personal factors associated with leadership. Attention is also focused on the significance of esteem, status, and control of members in determining who will attempt and who will be successful and effective as a coercive or persuasive leader. Motivation is central to this theory. The situational factors of significance included: the esteem, status, and control variance among members, the interaction probability among members, and the heterogeneity of ability and attitudes among members. For Technical reports 2-4 see PB 122311, 123044, 124342. Contract N7 onr-35609, Annual report.

Differential effects of noise and fatigue on a complex counting task, by Harry J. Jerison. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Oct 1956. 26p graphs, tables. Order from OTS. 75 cents. PB 121807

This report compares performance under the combined stress of noise and fatigue with that of fatigue alone. A complex mental counting test which involves mental work of a rather high order was the source of the performance measure. Although statistically significant differences between performance in noise and in quiet were found, these were not straightforward, and no simple relationship of the performance decrements and specific abilities could be established. It is therefore impossible to relate abilities involved in performance on the complex counting test to changes in performance under noise stress. Some indication was found of a direct relationship between susceptibility of individual subjects to auditory fatigue during a specific work period in noise and their ability to maintain performance in noise. AD 110506. Project 7193, Task 71614. AF WADC TR 55-359.

Effect of mock tower height in airborne training, by Charles D. Windle, Joseph S. Ward, Kimball Nedved and Jerome Nathan. George Washington University. Human Resources Research Office, Washington, D.C. May 1956. 24p photos, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 124636

The objective of this study was to determine whether the mock tower phase of the airborne training program could be accomplished more efficiently using these experimental procedures: (1) Having trainees make all mock tower jumps from heights lower than the standard 34-foot level; (2) Having trainees progress in gradual increments from lower heights to the standard level. The study was also intended to show whether mock tower training under these experimental conditions would adversely affect performance during later stages of airborne training. For earlier report in this series see PB 117828. GWU HRRO TR 29.

Effect upon the output of a complex man-machine system of quickening and damping a derivative feedback display, by Malcolm L. Ritchie and Harold E. Bamford, Jr. Illinois. University, Urbana, Ill. Apr 1957. 32p diagrs, graphs, tables. Order from OTS. $1.00. PB 131211

Mounting the gyroscopic turn indicator on the sloping panel of an all-weather interceptor resulted in negative quickening of the display indication. Experiments in an electronic flight simulator demonstrated the adverse effect of negative quickening and the favorable effect of positive quickening on the output of the man-machine system. Damping the motion of the indicator needle also improved performance. The optimum combination appears to be the quickening produced by 5° of gyro tilt plus 500% of normal damping. The findings are discussed in relation to a simplified model of the experimental man-machine system. AD 118069. Project 6190, Task 71573. Essentially this material was presented at the U.S. A.F. - N.R.C. Symposium on Personnel Training and Human Engineering Research, Nov 15-16, 1956 in Washington, D.C. AF WADC TR 57-103.

Effects of differing methods of test selection and test interpretation on learning in the interview, by John W. Gustad. Maryland. University. Dept. of Psychology, College Park, Md. Jun 1955. 52p tables. Order from LC. Mi $3.60, ph $9.30. PB 122317

Two problems are of principal concern in the present study. The primary one is concerned with studying the effects of different methods of introducing and interpreting test information in the vocational counseling interview situation. The second involves the development of a criterion against which to compare the effects of different treatments. The issues involved in both will be seen more clearly after a review of the literature. Contract Nonr-1225(00), NR 154-155, Final report.

Effects of sleep deprivation on performance of a complex mental task, by Walter D. Chiles. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeromedical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1955. 19p photo, graphs, tables. Order from OTS. 50 cents. PB 121369

Data were recorded on the performance of six subjects, each of whom was deprived of 30 hours sleep. The task on which these subjects performed required the making of a total of 200 discrete comparisons over a period of approximately 25 minutes. Three such performance periods were used: one at the beginning of the normal working day, a second approximately 24 hours later (no sleep having been permitted in the meantime), and a third approximately six hours after the second session. The performance of these subjects was compared with that of a control group of five subjects who

performed the test three times but did so on three separate days, each session having been preceded by a presumably normal night's sleep. The statistical analysis revealed a significant difference between the two groups, i.e., the control group showed significantly more improvement from the second to the third sessions than did the group deprived of sleep. The general conclusion was that subjects who are suffering from loss of sleep do not show the improvement which would be expected on the basis of the performance of control subjects when the fatigued subjects are confronted with a complex mental task which they have not as yet mastered. Project no. 7193, Task no. 71612. AF WADC TN 55-423.

Experiments on visual discrimination 1952-1955, by H.H. Corbin, E.P. Reese, T.W. Reese and J. Volkmann. Mount Holyoke College. Psychophysical Research Unit, South Hadley, Mass. Apr 1956. 59p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 125077

1. Visual perception - Psychological aspects 2. Targets - Detection 3. Contract AF 18(600)-344, Final report

Final report under Contract N6 ori-27014, by F.P. Kilpatrick. Princeton University, Princeton, N.J. May 1955. 61p. Order from LC. Mi $3.90, ph $10.80. PB 124085

Report covers all aspects of a research program in the field of visual perception. A list of books, articles, and reports prepared in connection with the Contract is included.

Investigation of task performance as a function of certain aspects of work-group structure, by Thornton B. Roby and John T. Lanzetta. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Tex. Jun 1956. 17p tables. Order from LC. Mi $2.40, ph $3.30. PB 125230

Airmen in groups of three were required to perform a laboratory task which simulated an aircrew task at a general level. Operator errors were recorded for performance of the task under four different communication structures. The conditions ranged from that in which control agents had direct access to none of the information required to operate their own controls to that in which control agents had direct access to information for all but one of their own controls (minimum communication required). Project 7731, Task no. 77436. AF PTRC TN 56-74.

Motivation and psychological stress, by M.H. Applezweig. Connecticut College. Dept. of Psychology, New London, Conn. May 1955. 17p. Order from LC. Mi $2.40, ph $3.30. PB 124288

Progress report to 30 Apr 1955. 1. Psychological tests 2. Group behavior - Tests 3. Psychological research 4. Contract Nonr-996(02), NR 172-228.

Motivational factors in productivity. Final technical report for the period Sep 1951 to Dec 1954 under Contract Nonr-233(09). California. University. Institute of Industrical Relations. Human Relations Research Group, Los Angeles, Calif. Apr 1955. 29p. Order from LC. Mi $2.70, ph $4.80. PB 122248

The specific work of the Group falls into the following four principal categories: (1) social structure and its correlates, (2) social sensitivity (3) criteria and evaluation of performance, and (4) leadership training and its evaluation. The specific studies which the Group has undertaken in each of these categories are discussed in the body of this report. Covers period from Sep 1951 to Dec 1954 under Contract Nonr-233(09).

Perceptual and motor skill research in German laboratories, 1940-1952, by Harry P. Bahrick. U.S. Air Force. Air Research and Development Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Jul 1953. 17p. Order from LC. Mi $2.40, ph $3.30. PB 124635

The present report is based upon the following items: 1. Reprints of studies of perceptual-motor skill, primarily of articles published in journals not readily available in the United States. 2. Copies of a few unpublished dissertations borrowed for partial translation and abstracting. 3. Notes on the physical plant, equipment, and staff of the laboratories visited. 4. General impressions concerning theoretical and experimental work in the various laboratories. Project 509-020-0004. Contract AF 33(038)-10528. AF HHRC RB 53-20.

Predictions of arrival sequences of simulated radar targets as a function of display size, target size, and target sharpness, by Lowell M. Schipper and John Versace. Ohio State University. Laboratory of Aviation Physchology, and Ohio State Research Foundation. Columbus, O. Nov 1956. 19p diagrs, graphs, tables. Order from OTS. 50 cents. PB 131179

This experiment investigated the ability of observers to judge which of two aircraft, displayed on a simulated catholde ray tube, would arrive at a fixed reference line first. Aircraft trails were represented by five equally bright "blips." The experimental variables were simulated display size, blip size, and blip sharpness. Four blip sizes for each of two display sizes were employed and blips were either sharply in focus or somewhat out of focus. A range of traffic situations

was provided using nine different times-to-go with six speed combinations and four blip sizes. Several thousand measurements on each of four observers were taken in a counterbalanced order over 16 experimental sessions using the psychophysical method of constant stimulus differences. AD 118275. Project 7192, Task 71596. AF WADC TR 56-72.

Preliminary analysis of the Thurstone color-form dominance test, by J.W. Bowles. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Tex. Nov 1955. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 124896

The Thurstone Color-Form Dominance Test was scored to yield two types of scores in this study: one score reflected a tendency on the part of the subjects to perceive moving colors vs. moving shapes, the other a tendency to see apparent movement as either upward or downward. Project 7704, Task no. 77091. AF PTRC TN 55-1.

Studies in abstractive generalization. Evaluations of the facilitating effects of training techniques upon transfer, by Sylvan J. Kaplan, William H. Melching and George Gentry. U.S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Texas. Nov 1955. 8p photos, diagr, tables. Order from LC. Mi $1.80, ph $1.80. PB 124975

Three groups of chimpanzees were subjected to different training techniques, and the influence of these techniques upon transfer of training was tested. None of the groups exhibited rapid transfer, and no group transferred more readily than any other group. The results were interpreted as providing little or no evidence that the chimpanzee has a capacity for abstractive generalization. AF SAM R55-1.

Submarine escape training experience. Summary of twenty-five year period, Jul 1929 through Dec 1954, by J.H. Peirano, H.J. Alvis and G.J. Duffner. U.S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. May 1955. 31p tables. Order from LC. Mi $ 3.00, ph $6.30. PB 124557

The authors, serving as a unit of the Commander Submarine Force, U.S. Atlantic Fleet's Submarine Escape Committee, analyzed the experience in submarine escape training as recorded at the Escape Training Tank, U.S. Naval Submarine Base, New London, Connecticut, with particular reference to the number and kinds of personnel casualties which occurred during the period July 1929 through December 1954. During this period 189,000 simulated escapes were made by trainees, 174,210 of these were made using the Submarine Escape Appliance (S.E.A.) and 14,826 were made without the use of any respiratory device, that is were "free" escapes. In both types of escape training air embolism accounted for the majority of casualties (15). Mediastinal emphysema and decompression sickness were also encountered. AD 72944. NMRI Proj NM 002 015.08.03. NAV MRL 264.

Two scales of attitudes of group members, and methodological alternatives in Guttman scaling, by Philip C. Sagi and Donald W. Olmsted. Minnesota. University. Dept. of Sociology, Minneapolis, Minn. May 1955. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 124615

This report has two objectives: 1. The presentation of two scales of the attitudes of group members, designed to measure "personal involvement in the group" (PI), and "estimate of group effectiveness" (EE). Each scale meets certain of the requirements of Guttman scale, and some additional evidence as to their reliability and external validity is given. 2. The presentation of alternative procedures for checking the inference of scalability in the use of the Guttman scaling technique when the number of items is small and item-response categories have been collapsed to dichotomies. The use of the alternatives is demonstrated with two attitude scales, and certain methodological questions are discussed briefly. Research on group structure and function as related to the personality characteristics and interests of group members, Contract N8 onr-66216, Technical report no. 3. For other reports under this contract see PB 120144, 122250, 123042, 123043, 124895 and 126352.

RUBBER AND RUBBER PRODUCTS

Copolymer research reports, no. 3935-3962. Federal Facilities Corporation. May 1956 - Aug 1956. 28 nos. Prices for individual reports in microfilm or photocopy will be furnished upon request by the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D.C. PB 118310s3

Supplements PB 118310 and 118310s2. Contents: Arkon University. Contract NSF/RR-C-1: CR 3935. Quarterly progress report for Apr 1 - Jun 30, 1956. Jul 1956. - Akron University. Gov't. Laboratories. Contract NSF/RR-C-7: CR 3936. Storage stability of carbon black masterbatches. May 1956. - CR 3937. Modification of standard operating specifications for 500-gallon charges at low temperatures. May 1956. - CR 3938. Continuous polymerization by alfin catalysis (Polymerization of butadiene). Feb 1956. - CR 3939. Heat softened masterbatches. May 1956. - CR 3940. Factors influencing oil-masterbatched polymers (Breakdown of polymers prepared at 0°,

41°, and 122°F. - CR 3941. A study of the heat stability of raw and compounded GR-S-1500 type polymers. Jun 1956. - CR3942. Experiments with the stress - relaxation equipment. Jun 1956. - CR 3943. Polystyrene with molecular weight of narrow range. Jun 1956. - CR 3944. Preparation of 80/20 butadiene/acrylic acid copolymer at 122°F. Jun 1956. - Burke Research Company. Contract NSF/RR-C-8: CR 3945. Annual summary report, Jul 1, 1955 to Jun 30, 1956. - Case Institute of Technology. Contract NSF/RR-C-9: CR 3946. Annual summary report for Jul 1, 1955 - Jun 30, 1956. Jul 1956. - CR 3947. Quarterly summary report for Apr 1 - Jun 30, 1956, from Department of Chemistry and Chemical Engineering. Jul 1956. - Cornell University. Contract NSF/RR-C-3: CR 3948. Quarterly summary report for Apr 1, 1956 - Jun 30, 1956 and final summary report. - Cornell University. Baker Lab. Contract NSF/RR-C-10: CR 3949. Quarterly summary report for Apr 1, 1956 - Jun 30, 1956 and final summary report. - University of Illinois. Contract NSF/RR-C-4: CR 3950. Condensed summary: Organic chemistry polymer research. Jun 1956. - CR-3951. Quarterly summary report. Apr 1 - Jun 30, 1956. - CR 3952. Copolymerization of 1,2-di (2-pyridyl) ethylene. Jun 1956. - CR 3953. Copolymerization of butadiene with 2-methyl-5-cinnamoylpyridine, 3-cinnamoylpyridine and 3-pyridalacetophenone. Jun 1956. - CR 3954. Polymers and copolymers of 2-methyl-3-alkyl-1,3-butadiene. Jun 1956. - CR 3955. Copolymerization of trans-methyl -benzoylacrylate with butadiene. Jun 1956. - CR-3956. An attempt to prepare an all cis polydimethyl-butadiene. Jun 1956. - CR 3957. Cyclic and poly-mercaptals and mercaptols. Aug 1956. - University of Minnesota. Contract NSF/RR-C-6: CR 3958. Quarterly summary report, Apr - Jun 1956. - CR 3959. Yearly summary report Jul 1, 1955 to Jun 30, 1956. - CR 3960. Mechanism of retardation in emulsion polymerization of styrene. Aug 1956. - Mellon Institute of Industrial Research. NSF/RR-C-11: CR 3961. Eighty-seventh report on fundamental correlations between physical properties and molecular parameters of synthetic rubbers, Apr 1, - Jun 30, 1956. - U.S. National Bureau of Standards. Contract NSF/RR-C-12: CR 3962. Progress report for Apr 1 - Jun 30, 1956 and Summary report, fiscal year 1956.

Effects of rubber compositions, rubber chemicals and plasticizers upon polyethylene, by Sydney Axelrod. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Feb 1957. 19p tables. Order from OTS. 50 cents. PB 131091

The object of this research was to determine the effect of contact with rubber compositions, rubber chemicals, and plasticizers on the mechanical properties of polyethylene. Ordnance project TB4-521. Dept. of the Army project 593-15-008. PATR 2397.

Investigation of condensation type elastomers, by George C. Schweiker, Burton S. Marks, Russell R. White and Rudolph N. Deleo. Hooker Electrochemical Company, Niagra Falls, N.Y. May 1957. 55p graphs, tables (1 fold). Order from OTS. $1.50. PB 131178

Preliminary compounding and testing studies with an elastomer based on a fluorine-containing polyester, made from adipyl chloride and 2, 2, 3, 3, 4, 4-hexafluoropentanediol, have given promising results. This report describes the preparation, compounding, cross-linking and properties of hexafluoropentylene adipate elastomer, as well as syntheses and properties of other fluorine-containing condensation polymers and difunctional starting materials. Data indicating that increasing fluorine content of the polymers decreases their solubility in common solvents without regard to position of the fluorine in the polymer are extended. On the other hand, these data show that position of the fluorine, rather than total fluorine content of the polymer is of most importance in affecting brittle temperatures. AD 118294. Project 7340, Task 73404. Covers work from 1 Dec 1955 - 1 Dec 1956 under Contract AF 33(616)-2421. Includes summary progress report: Fluorine containing monomers for condensation polymers, by Earl T. McBee. AF WADC TR 55-221, Part 3.

Preparation and polymerization of some fluoroalkylmethylcyclosiloxanes, by Eugene C. Stump, Jr. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1957. 17p table. Order from OTS. 50 cents. PB 131205

Four fluoroalkylmethyldichlorosilanes were hydrolyzed and the resulting cyclosiloxanes separated and characterized. Attempts to homopolymerize the fluoroalkylmethylcyclosiloxanes resulted in viscous fluids. Gum copolymers with octamethylcyclotetrasiloxane were prepared by conventional methods. Fluorine-containing cyclosiloxanes may also be prepared from the higher molecular weight siloxane residues of the hydrolysis reaction by passing through a hot tube at 470-520°C. AD 118344. Project 7340, Task 73404. Covers work from Oct 1955 - Apr 1956. AF WADC TR 56-493.

STRUCTURAL ENGINEERING

Response of beams and plates to random loads, by A. Cemal Eringen. Purdue University. Division of Engineering Sciences, Lafayette, Ind. Jul 1955. 24p graphs. Order from LC. Mi $2.70, ph $4.80. PB 124503

With the use of generalized harmonic analysis the problem of vibrating damped beams and plates under stochastic loading is solved. The resulting equations give the cross correlation functions for

displacements, stresses, moments, etc., in terms of the cross correlation function of external pressure. Mean square values of these functions calculate the probable number of times per time, the random displacements or stresses will exceed a given value. The cases of simply-supported bars, cantilever bars, clamped circular plates and simply-supported rectangualr plates are worked out in detail. Contract Nonr-1100(02), Technical report no. 7.

Scale model tests for high-pressure high-temperature steam piping. Second partial report, by Irwin Vigness. U.S. Naval Research Laboratory. Jun 1941. 48p diagrs, graphs, tables. Order from LC. Mi $3.30, ph 7.80.
PB 122683

For 1st and 3rd partial reports see 0-1684 and 0-1829 (PB 122731). 1. Steam pipe lines - Models - Tests 2. NRL O 1749

TEXTILES AND TEXTILE PRODUCTS

Evaluation of fungicidal treatments in cotton cargo parachute webbings stored at Wright Air Development Center, by Emma F. Little. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. May 1957 98p photos, diagr, graphs, tables. Order from OTS. $2.50.
PB 131158

Five fungicidal formulations, with or without water repellents, were applied to four types of cotton cargo parachute webbings. Three of the formulations contained copper 8-quinolinolate, one contained dihydroxy-dichlorodiphenyl methane, and one contained dehydroabietyl ammoniym acetate. In order to determine the efficiency of these formulations in the webbings, five evaluations were made: (1) soil burial, (2) simulated tropical storage, (3) shelf storage under laboratory conditions, (4) agar plate exposure, and (5) agar plate exposure following laboratory shelf storage. Cellulolytic fungi used as test organisms were Aspergillus terreus, Myrothecium verrucaria, and Chaetomium globosum. Conclusions were based on general appearance and breaking strength data derived from tests of webbings and webbing threads, chemical analyses and visual observations. AD 118322. Project 7312, Task 73124. Covers period from May 1953- Aug 1955. AF WADC TR 56-384, Part 1.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Determination of daytime conspicuity of transport aircraft, by Wayne D. Howell. U.S. Civil Aeronautics Adminstration. Technical Development Center, Indianapolis, Ind. May 1957. 27p photos, diagrs, graphs, tables. Order from OTS. 75 cents. PB 131122

The conspicuity of present-day transport aircraft was determined by measuring in daytime flight the distances at which pilots of one aircraft became aware of another DC-3 aircraft, normally painted and normally equipped, as it approached from various angles on courses which would result in collisions. Also during these collision runs, the threshold distance, ultimate distance from which a DC-3 aircraft can be seen with the naked eye, was recorded. CAA TDR 304.

Development of aircraft windshields to resist impact with birds in flight, by Pell Kangas and George L. Pigman. U.S. Civil Aeronautics Administration. Technical Development Division, Indianapolis, Ind. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Collision of birds with aircraft in scheduled commercial operations in the continental United States, Jan 1949. 21p map, diagr, graphs, tables. Mi $2.70, ph $4.80.
PB 127850

For Part 3 see PB 122305. 1. Birds - Collision with aircraft 2. CAA TDR 62

Part II: Investigation of windshield materials and methods of windshield mounting. Feb 1950. 64p photos, drawings (part fold), graphs, tables (part fold). Mi $3.90, ph $10.80. PB 127832

1. Windshields, Laminated glass - Impact tests 2. Windshields, Aircraft - Materials 3. Plastics, Laminated - Strength 4. CAA TDR 74

Similitude relations for free-model wind-tunnel studies of store-dropping problems, by Carl A. Sandahl and Maxime A. Faget. U.S. National Advisory Committee for Aeronautics. Jan 1957. 26p photos, diagrs, graphs, table. Order as TN 3907 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124446

Two methods, in which the model and prototype Mach numbers are assumed equal and the Reynolds number effects are assumed negligible, are presented for scaling store models for wind-tunnel store-dropping studies. A brief description of the method of conducting store-dropping tests in the preflight jet of the Langley Pilotless Aircraft Research Station at Wallops Island, Va., is given. NACA TN 3907.

Study to establish a parachute research and development program, by C.R. Jacobsen, C.D. Hartman, H.W. Bixby, L.N. Christian, E.G. Ewing, R.G. Peterson, W. Aron, J.W. Dauncy and J.W. McCarty. Radioplane Company, Van Nuys, Calif. Contract AF 18(600)-138. Project 6065, Task no. 61524. Order separate parts described below from LC, giving PB number of each part ordered.

Vol. II: Summary and analysis of existing knowledge. Aug 1953. 511p drawings, diagrs, (1 fold) graphs, tables. Mi $11.10, ph $78.00. PB 127750

The purpose of the study was to establish the basis for planning a research and development program for parachutes. The present state of the parachute art, as reported in approximately 3000 documents reviewed during the course of the program, is summarized. The documentary information was supplemented with unreported experience of engineers and organizations working with parachutes. The summary includes an analysis and evaluation of this parachute information to determine the applicability and validity of existing data. AD 110452. Covers work from Apr 1952 - Aug 1953. Table of contents for Vol. 3 in this volume. Contents: Symbols. - Sec. I. Aerodynamics. - Sec. II. Dynamic stability. - Sec. III. Deployment and opening process. - Sec. IV. Stress analysis. AF WADC TR 53-78, Part 2.

Vol. III: Summary and analysis of existing knowledge. Aug 1953. 475p photos, drawings (part fold), diagrs (part fold), graphs, (part fold), tables. Mi $11.10, ph $72.60. PB 127751

AD 110453. Covers work from Apr 1952 - Aug 1953. See PB 127750 for Table of Contents. Contents: Sec. V. Design and fabrication. - Sec. VI. Experimental methods and equipment. - Sec. VII. Applications and techniques. - Sec. VIII. Materials. AF WADC TR 53-78, Part 3.

Instruments

Development and flight tests of the CAA type VI course line computer, by Hugh Kay. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1951. 13p photos, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 127858

1. Flight paths - Computation 2. Computers, Flight 3. CAA TDR 143

Development of an automatic counting accelerometer, by Cecil B. Phillips and Marvin J. Anderson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1952. 13p photos, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127844

For description of earlier model see PB 122299.
1. Accelerometers, Recording - Tests 2. Airplanes - Acceleration - Measuring equipment 3. CAA TDR 166

Equipment cooling system for aircraft. Ohio State University. Dept. of Mechanical Engineering, Columbus, O. Contract AF 33(616)-147. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: Summary of cooling system study, by R. H. Zimmerman and W. Robinson. Sep 1954. 88p diagrs, graphs. $2.25. PB 121256

Part I presents an introduction to the scope of the study, concerned with the analytical evaluation of equipment cooling systems for steady-state conditions of aircraft and equipment operation over ranges of altitudes from sea level to 65,000 feet, flight Mach numbers up to 1.8, equipment temperatures 130° to 250°F, equipment dispersion up to 150 feet and system cooling capacities up to 75 kilowatts. Terminology peculiar to the study is defined. Seven types of cooling systems are defined as ram air, expanded ram-air, bleed air, blower, fuel, expendable and vapor cycle refrigeration systems. The results obtained in the evaluation of these systems of direct and indirect type are summarized with reference to physical characteristics, aircraft gross weight, penalty and other merit considerations. Conclusions in reference to the applicability and suggestions for the areas of needed additional investigation are presented for several of the systems studied. AF WADC TR 54-359, Part 1.

Part II: Aircraft penalty methods and system components characteristics, by R.H. Zimmerman. Sep 1954. 193p diagrs, graphs. $4.00. PB 121234

Part 2 of the report contains data developed and compiled for use in the evaluation of cooling systems. Methods are given for the evaluation of aircraft penalty of cooling sys-

tems in terms of equivalent drag, increase in gross weight, reduced range, or reduced payload. The components of cooling systems are classified as equipment, distribution, intermediate and ultimate. Methods for the analytical simulation of equipment items by means of an equipment component are developed. The physical characteristics and performance of coolant distribution systems are analyzed for constant velocity, constant-pressure-gradient, and constant-diameter designs. Methods are developed for the analytical representation of cooling load distribution along the header of a distribution system. Various types of heat exchangers applicable as intermediate components in cooling systems are analyzed. Methods are developed for the evaluation of physical characteristics of air-to-air, liquid-to-air, and liquid-to-evaporant heat exchangers. Data on performance and physical characteristics are compiled for items serving as parts of the ultimate component of cooling systems, including air intakes, air ducts, radial and axial blowers, compressors and turbines. Covers work performed between Jun 1952 and Aug 1954. AF WADC TR 54-359, Part 2.

Flight tests of the United Air Lines stall warning system, by C.J. Janes. U.S. Civil Aeronautics Administration. Technical Development Division, Washington, D.C. Apr 1945. 16p photos, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 127849

1. Airplanes - Stalling - Warning devices - Tests 2. CAA TDR 50

Mean least turn and its relation to making settings on a linear scale, by William L. Jenkins. Lehigh University, Bethlehem, Pa. May 1957. 42p diagrs, graphs, tables. Order from OTS. $1.25. PB 131197

This study was concerned with the least turn of a knob that can be made on a tactual-kinesthetic basis without visual guidance under various conditions of knob diameter, inertia, and friction; and also the influence of knob shape, position, and orientation on mean least turn and on the time to make settings on a linear scale. AD 118174. Project 7182, Task 71512. Contract AF 33(616)-2850. AF WADC TR 57-210.

Engines and Propellers

Determination of means to safeguard aircraft from power-plant fires in flight. Part VI: North American tornado (Air Force XB-45), by C.M. Middlesworth. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1954. 58p photos, graphs, diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 127838

1. XB-45 (Airplane) 2. Fire prevention - Airplanes 3. Power plants - Fire prevention 4. Fire extinguishers - Tests 5. CAA TDR 221

Determination of the structural damping coefficients of six full-scale helicopter rotor blades of different materials and methods of construction, by Frederick W. Gibson. U.S. National Advisory Committee for Aeronautics. Dec 1956. 19p diagrs, tables. Order as TN 3862 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124413

1. Helicopter blades - Bending moments 2. Helicopter blades - Wind tunnel tests 3. Wings, Rotating - Theory 4. Damping derivatives - Coefficients 5. Vibration - Damping 6. NACA TN 3862.

Experimental investigation on the Langley helicopter test tower of compressibility effects on a rotor having NACA 632-015 airfoil sections, by James P. Shivers and Paul J. Carpenter. U.S. National Advisory Committee for Aeronautics. Dec 1956. 28p photo, graphs. Order as TN 3850 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124404

1. Helicopters - Rotors - Pitching moments 2. Helicopter blades - Performance - Tests 3. Helicopter blades - Pitching moments - Effect of compressibility 4. Helicopters - Hovering - Effect of compressibility 5. NACA TN 3850

Investigation of the vulnerability of aircraft engine oil tanks to accessory section fires, by J.J. Gassman. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1952. 9p photos, tables. Order from LC. Mi $1.80, ph $1.80. PB 127839

1. Tanks, Fuel - Fire protection 2. CAA TDR 159

Airports and Airways

Analytical and simulation studies of terminal-area air traffic control, by Samuel M. Berkowitz and Edward L. Fritz. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind., and Franklin Institute. Laboratories for Research and Development. May 1955. 59p photo, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 127837

1. Airports - Air traffic control 2. CAA TDR 251

Analysis of the candlepower distribution requirements of runway lights, by Marcus S. Gilbert and H.J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 21p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127835

1. Runways - Markers 2. Airports - Lighting 3. CAA TDR 178

Determination of some geometric relationships pertaining to collision flight paths, by Wayne D. Howell and Thomas M. Edwards. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1955. 139p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 127836

A study has been made to develop a basic means, in the form of graphs and charts, for permitting a better understanding of cockpit visual problems and aircraft conspicuity problems as they are related to mid-air collisions. Formulas are derived and visual-angle and distance charts are presented for certain combinations of straight-and-level, climbing, descending, and turning flight conditions. Using only aircraft headings and speeds, the visual angles and distances between aircraft at assumed instances of time prior to collision may be determined from these charts. It is also possible to obtain critical collision-course headings by entering the charts with the effective cockpit cut-off vision angles and speeds. Tables are presented showing actual airplane attitudes during flight. Actual flight paths recorded in the vicinity of airports are presented. CAA TDR 259.

Load transmission test for flexible paving and base courses. Part I. Description of the testing apparatus, operating methods, and anticipated uses of test data, by Raymond C. Herner and William M. Aldous. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1950. 12p photos, diagr. Order from LC. Mi $2.40, ph $3.30. PB 127853

For Parts 3-5 see PB 123577, 111828 and 121146. 1. Pavements, Flexible - Loads 2. Pavements, Flexible - Impact tests 3. CAA TDR 108

Modifications of the slope line approach light system, by H.J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1952. 10p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 127845

1. Lights, Approach - Design 2. Runways - Lights 3. CAA TDR 167

Perspective analysis of the proposed ALPA approach light system. Supplement to Technical Development Report No. 96, "Perspective analysis of approach light patterns", by Roy E. Warren. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1951. 17p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 127856

Supplement to PB 123567. 1. Lights, Approach - Design 2. Runways - Lights 3. CAA TDR 133

Simulation tests for Army air traffic control, by Tirey K. Vickers. U.S. Civil Aeronatics Administration. Technical Development Center, Indianapolis, Ind. May 1957. 23p diagrs, graphs, tables. Order from OTS. 75 cents. PB 131127

This report describes the testing of a number of concepts which have been proposed to meet the specialized requirements of Army aviation during the next few years. These concepts cover such subjects as airway structures, airport designs, and navigation and scheduling procedures, to define a simplified system for the control of large numbers of logistic and support aircraft in almost complete radio silence. CAA TDR 298.

Slope line approach light system, by H.J. Cory Pearson. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1950. 39p photos, diagrs, graphs, tables. Order from LC. Mi $ 3.00, ph $ 6.30. PB 127852

1. Lights, Approach - Design 2. Runways - Lights 3. CAA TDR 104

Aerodynamics

Aerodynamic characteristics of a circular cylinder at Mach number 6.86 and angles of attack up to 90°, by Jim A. Penland. U.S. National Advisory Committee for Aeronautics. Jan 1957. 32p photos, drawings, diagrs, graphs. Order as TN 3861 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124412

1. Cylinders, Circular - Wind tunnel tests 2. Flow, Supersonic - Theory 3. Loads, Aerodynamic - Theory 4. Angle of attach - Effect on lift coefficient 5. NACA TN 3861

Calculation and compilation of the unsteady-lift functions for a rigid wing subjected to sinusoidal gusts and to sinusoidal sinking oscillations, by Joseph A. Drischler. U.S. National Advisory Committee for Aeronautics. Oct 1956.

59p diagrs, graphs, table. Order as TN 3748 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124360

1. Lift coefficient 2. Gust loads - Mathematical analysis 3. NACA TN 3748

Design and testing of an axisymmetric hypersonic nozzle for a low density wind tunnel, by George J. Maslach and F.S. Sherman. California. University. Institute of Engineering Research, Berkeley, Calif. Aug 1956. 106p photos, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 125081

This report deals with the initiation of the extension of low density axisymmetrical nozzle design into the hypersonic regime. The theoretical procedure for the design of a Mach number 6 nozzle is shown in detail and some salient features presented. Correction for the displacement thickness of the boundary layer is made. The transonic flow in the throat vicinity is studied by a series expansion method, based on small deviations from the speed of sound. The supersonic flow field is laid out by the method of characteristics. The performance of the nozzle is experimentally evaluated and showed useful velocity distribution after the final contour correction. The modified wind tunnel facility and the instrumentation is described. Many suggestions for construction details of low density research facilities are given. AD 97178. Project 1363, Task 70134. Contract AF 33(616)-418. AF WADC TR 56-341.

Effect of support interference on the base pressure of a body of revolution at high Reynolds numbers, by Kenneth R. Sivier and Seymour M. Bogdonoff. Princeton University. James Forrestal Research Center. Gas Dynamics Laboratory. Oct 1955. 49p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 124723

An experimental investigation has been made of the effect of a rear support sting on the base pressure of an ogive-cylinder body at a Mach number of 2.97 and at Reynolds numbers from 10×10^6 to 40×10^6. The body was mounted on wings to permit the measurement of a free base pressure. Stings having diameters from 0.6 to 0.0625 times the body's base were employed to check the sting effect. Checks were made to assure that the present results were not affected by finite sting length. A second ogive cylinder body, without mounting-wings, was supported on a rear sting to check the effect of the wing on the base pressure. AD 79169. Report no. 332. Contract AF 18(600)-498. AF OSR TN 55-301.

Low-speed experimental investigation of the effect of a sandpaper type of roughness on boundary-layer transition, by Albert E. von Doenhoff and Elmer A. Horton. U.S. National Advisory Committee for Aeronautics. Oct 1956. 43p photos, graphs. Order as TN 3858 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124410

1. Boundary layer - Transition point - Tests 2. Boundary layer - Transition point - Effect of roughness 3. NACA TN 3858

Motions of rolling symmetrical missiles referred to a body-axis system, by Robert L. Nelson. U.S. National Advisory Committee for Aeronautics. Nov 1956. 51p diagrs, graphs. Order as TN 3737 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124363

1. Equations of motion 2. Stability, Dynamic - Mathematical analysis 3. Missiles - Aerodynamics 4. NACA TN 3737

Rockets and Jet Propulsion

Evaluation of the potential merits of ducted pulsejets, by George Rudinger. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Oct 1949. 43p diagrs, graphs. Order from OTS. $1.25. PB 131167

A ducted (or shrouded) pulsejet consists of a conventional pulsejet that is completely submerged in a surrounding duct; this will permit operation at flight velocities that are so high that a pulsejet alone would not function at all. An analysis of such a powerplant is presented in which the nonsteady phenomena are replaced by "effective" steady state conditions and certain other simplifying assumptions are introduced. For comparison purposes, an analysis of the ramjet based on similar assumptions is also carried out. The main purpose of this first phase of the investigation is an evaluation of the range of flight Mach numbers in which the ducted pulsejet may be superior to either the pulsejet alone or the ramjet, the duct configuration will always be taken as the optimum for any flight Mach number considered. Specific thrust and specific impulse are determined as functions of flight Mach number. The effect of altitude is combined with specific thrust to give a nondimensional performance parameter. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL -32-M.

Study of hot pressing of beryllium rocket nozzles, by Chester A. Bielawski, Theordore M. Harkulich and Russell E. Long. Brush Beryllium Company, Cleveland, O. May 1957. 58p photos, drawings, graphs, tables. Order from OTS. $1.50. PB 131202

A preliminary investigation was conducted on the variables of particle size, temperature, pressure, and time as related to the fabrication of beryllia rocket-nozzle throat inserts by hot pressing.

Results of this work were applied toward the fabrication of twenty, 100-pound-thrust throat-insert specimens which were submitted for evaluating the feasibility of using this material in uncooled rocket motors. The twenty specimens were composed of four groups representing variations in starting materials with regard to particle size and purity and variations in fabrication procedures, including time, temperature, and heat treatments, which affected the final structure. AD 118278. Project 7350, Task 73500. Covers work from Jun through Nov 1956 under Contract AF(30-1)-541. AF WADC TR 57-32.

Marine Transportation

Drift of buoys in the Arctic seas (Drief buev v Arkticheskikh moriakh), by V. Iu Vize. Translated by David Kraus. Dec 1955. 3p table. Order from LC. Mi $1.80, ph $1.80. PB 124106

AB 27132. Translated from Problemy Arktiki (2): 122, 1944 for the Geophysics Research Directorate, AF Cambridge Research Center, Cambridge, Mass., by the American Meteorological Society under Contract AF 19(604)-1364. 1. Buoys - Hydrodynamics - Arctic region 2. Currents, Ocean - Measurement - Arctic region

Guide for design of shock resistant Naval equipment. U.S. Navy Dept. Jul 1949. Order from LC. Mi $6.30, ph $19.80. PB 126199

An attempt is made to provide a correlation between the analytical approach to the problem and the empirical methods which have been used in the past for designing shock resistant equipment. This publication represents the efforts of many industrial concerns, and of various Naval activities. Contract Nobs-45310. NAVSHIPS 250-660-30.

MISCELLANEOUS

Report of NRL progress. U.S. Naval Research Laboratory. Aug 1957. 70p. Order from OTS. $1.25. Also available on annual subscription rate of $10 a year in the U.S.A., foreign rate $13 a year. PB 131274

Contents: New arc melting facility for reactive metals, by R.W. Huber, E.J. Chapin and I.R. Lane, Jr. - A microwave hohlraum, by A.E. Lilley. - Scatter propagation in thunderstorm conditions, by W.S. Ament, S.C. MacDonald and D.L. Ringwalt. - Scientific program: Problems accepted: Problem notes: Applications research: Human factors in the design of systems. - Astronomy and astrophysics: Thermal radiation of the moon at 0.86 cm wavelength ... Measurements of radiation from Venus at 3.15 cm wavelength... First ionospheric electron density measurements performed directly in the auroral zone at an altitude above 75 miles ... Minitrack system for tracking the artificial earth satellite ... Solar-blind ultraviolet detectors. - Chemistry: Determination of water in jet fuels and hydrocarbons... A conductometric analysis for sulfate ion in hydrogen peroxide ... Foam-compatible dry chemical fire extinguishing powders. - Electricity: Study of time varying circuit analysis for application to machines. - Mechanics: Use of the conoscope for the inspection of hot-stretched aircraft glazing materials ... Investigation of polymethyl alpha choroacrylate as an aircraft glazing material ... Research and development of pulse-jet gas turbine combustors for Naval use. - Metallurgy and ceramics: Cracking of steel in corrosive environments ... Temperature variation of the resistivity of the Ni-Pd system ... Steady-state creep of crystals. - Nuclear and atomic physics: Temperatures of some 700,000°K in 0.15mm Hg of deuterium are indicated from preliminary shock velocity measurements ... Diagnostic studies of high-temperatures plasmas utilizing time-resolved spectroscopy and microwave techniques ... A study of photons in NaI(Tl) scintillation counters... Instrumentation for the NRL neutron diffraction program ... Proposed method for producing sustained self-focusing streams of nuclear particles. - Optics: Evaluation of a high-intensity all-around signaling beacon. - Radio: Experimental distributed power amplifier ... A dial display incorporating a data reference check and a discrete go-no-go error indicator ... Study of the oxide cathode in demountable vacuum systems ... Admittance of a pn junction with arbitrary surface recombination velocity ... Scattering properties of wide slots in a parallel-plate transmission line. - Solid state physics: Irradiation of polyvinyl methyl ether with electrons and gamma rays to form elastomers ... Milliroentgen dosimetry with the thermoluminescent $CaSO_4$: Mn powder ... Effects of plastic deformation upon magnetostriction in cold-worked, grade A nickel ... Through focus series with the NRL electron probe micro-analyzers ... "Spring plasma" model for low temperature vibrational spectra of cubic metals. - Sound: Modulus of rupture of zxt 45 ADP crystals used in sonar transducers. - Published reports. - Papers by NRL staff members. - Patents.

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Biology and Medicine

Summary of medical studies on Hiroshima children exposed to the atomic bomb, 1951 - 1953, by Wataru W. Sutow. Atomic Bomb Casualty Commission, Hiroshima, Japan. Apr 1957. 100p. Order from OTS. 55 cents. NYO-4478

Quarterly progress report for period ending Mar. 31, 1955. California. Univ., Los Angeles. Apr 1955. Decl. Mar 6, 1957. Contract AT-04-1-Gen-12. 107p. Order from LC. Mi $5.70, ph $ 16.80. UCLA-329

Quarterly progress report for period ending June 30, 1956. California. Univ., Los Angeles. July 1956. Decl. Mar. 6, 1957. Contract AT-04-1-GEN-12. 107p. Order from LC. Mi $5.70, ph $ 16.80. UCLA-371

Quarterly progress report for period ending Sept. 30, 1956. California. Univ., Los Angeles. Oct 1956. Decl. Mar 6, 1957. Contract AT-04-1-GEN-12. 144p. Order from LC. Mi $7.20, ph $22.80. UCLA-379

Effect of Pacific weapons testing on background activities in the State of California, by L. Baurmash, J. W. Neel, and R. F. Butts. California. Univ., Los Angeles. May 14, 1957. Contract AT-04-1-GEN-12. 33p. Order from LC. Mi $3.00, ph $6.30. UCLA-388

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Biology and Medicine quarterly report, January, February, March 1957 by Patricia W. Durbin and C. Willet Asling. University of California, Radiation Lab., Berkeley, California. Apr 19, 1957. Contract W-7405-Eng-48. 37p. Order from OTS. 30 cents. UCRL-3758

Tissue-culture growth stimulation by nucleic acid- and lipid-rich subfractions of the embryonic nucleoprotein fraction, by Roman J. Kutsky, Frank Lindgren, and Alex V. Nichols. Univ. of California, Radiation Lab., Berkeley, California. June 1957. Contract W-7405-Eng-48. 11p. Order from OTS. 15 cents. UCRL-3810

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Effects of nuclear explosions on canned foods, by Carlos A. Greenleaf and others. Food and Drug Administration, Dept. of Health, Education, and Welfare, Washington, D. C. and Federal Civil Defense Administration, Battle Creek, Mich. May 1957. 89p. Order from OTS. 50 cents. WT-1212

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Production of 891 (crystalline boron): Microscopical examination of cross-sections of 891 as deposited on core. Progress Report, by T. G. Rochow. Apr 1944. Decl. Feb 12, 1957. Contract W-7401-Eng-91. 30p. Order from LC. Mi $2.70, ph $4.80. A-1791

Study of the reaction rate for the ion exchange system Dowex-50, calcium, and sodium under flow conditions, by N. T. Anderson and

F. N. Peebles. Univ. of Tennessee, Knoxville, Tenn. Dec 1956. Contract W-7405-Eng-26, Subcontract No. 783. 77p. Order from OTS. 45 cents. AECU-3462

Experimental study of the performance characteristics of a continuous countercurrent ion exchange column, by G. M. Drake, Jr., and F. N. Peebles. Univ. of Tennessee, Knoxville, Tenn. Mar 1957. Contract W-7405-Eng-26, S-783. 90p. Order from OTS. 50 cents. AECU-3463

Studies of particle size distribution in fluidized beds, by H. M. Katz. Argonne National Laboratory, Lemont, Ill. May 1957. Contract W-31-109-Eng-38. 20p. Order from OTS. 20 cents. ANL-5725

Column adsorption methods in analytical chemistry, by Jack Schubert. Chicago. Univ., Illinois. Jan 1946. Decl. Feb. 15, 1957. Contract W-7401-Eng-37. 25p. Order from LC. Mi $2.70, ph $4.80. CC-3402

Effect of mercury on the corrosion of type 309SCb stainless steel, in acid nitrate solutions, by F. L. Culler. Oak Ridge National Lab., Tenn. Sept 1951. Decl. Feb. 20, 1957. Contract W-7405-Eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-51-9-152

Preparation of acid deficient aluminum nitrate by electrodialysis, by E. J. Parsi. Oak Ridge National Lab., Tenn. July 1954. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 20p. Order from LC. Mi $2.40, ph $3.30. CF-54-7-97

Metallurgy of 94; report for month ending Nov. 6, 1943. Chicago. Univ. Metallurgical Lab. Ill. Decl. Feb. 16, 1957. Contract W-7401-Eng-37. 7p. Order from LC. Mi $1.80, ph $1.80. CK-1040

Surface reactions of zirconium, barium and tellurium ions with lanthanum fluoride and manganese dioxide. Summarizing Report: Part I. Problem Assignments: 205-X48C and 203-X72C, by Howard Gest and W. H. Burgus. Clinton Labs., Oak Ridge, Tenn. July 1944. Decl. Feb. 16, 1957. Contract W-7401-Eng-37. 23p. Order from LC. Mi $2.70, ph $4.80. CN-1641

Coprecipitation of the trivalent rare earths with bismuth phosphate. Final report for the period June 15, 1944 to Jan. 1, 1945 on Problem Assignment 203-X72C. Part IV, by L. S. Meyers, Jr. Clinton Labs., Oak Ridge, Tenn. Jan 1945. Decl. Feb. 16, 1957. Contract W-7405-Eng-39. 48p. Order from LC. Mi $3.30, ph $7.80. CN-2558

Semi-annual report in Chemical Engineering for the period April 1, 1951-September 30, 1951, by G. L. Bridger and others. Ames Lab., Ames, Iowa. Nov. 18, 1951. Decl. Feb. 26, 1957. Contract W-7405-Eng-82. 22p. Order from LC. Mi $2.70, ph $4.80. ISC-186

Semi-annual summary research report in Chemistry for July - December, 1956, by Ames Lab. Staff. Ames Lab., Ames, Iowa. Mar 1957. Contract W-7405-Eng-82. 43p. Order from OTS. 30 cents. ISC-834

Simple molecular models of fused salt melts, by L. Monchick. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1957. Contract W-31-109-Eng-52. 17p. Order from OTS. 20 cents. KAPL-1776

Project summary conversion of UF_6 to homogeneous reactor fuel (57-D). Period Covered: Apr 1, 1952 - January 31, 1953. Vitro Corp. of America, New York, N. Y. Apr 1953. Decl. Feb 26, 1957. Contract AT (11-1) 217. 81p. Order from OTS. 50 cents. KLX-1612

Preparation of high-purity thorium oxide, by Robert N. Roberts. Los Alamos Scientific Lab., Los Alamos, N. M. June 1957. Contract W-7405-Eng-36. 18p. Order from OTS. 25 cents. LA-1934

Determination of uranium in a mixtrue of bromine, bromine trifluoride and uranium hexafluoride, by W. J. Gardner. North American Aviation, Inc. Downey, Calif. May 1953. Decl. Mar 2, 1957. Contract AT-11-1-Gen-8. 9p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-237

Quarterly progress report for January, February, and March 1953. National Bureau of Standards, Washington, D. C. June 1953. Decl. Feb. 28, 1957. 58p. Order from LC. Mi $3.60, ph $9.30. NBS-D-123

Chemical analysis of zirconium and Zircaloy metals, by E. B. Read and H. M. Read. Nuclear Metals, Inc., Cambridge, Mass. Jan 1957. Contract AT(30-1)-1565. 110p. Order from OTS. 60 cents. NMI-1171

Contributions to the chemical analysis of copper in Zircaloy, silicon in uranium-silicon alloys, and

niobium in uranium-niobium alloys, by E. B. Read and others. Nuclear Metals, Inc. Cambridge, Mass. May 1957. Contract AT (30-1)-1565. 21p. Order from OTS. 25 cents. NMI-1178

Study of water in brown oxide (UO_2) and its influence on the oxidation of that material, by S. H. Huston. Technical Information Service, Oak Ridge, Tenn. Mar 11, 1948. Decl. Apr 9, 1957. 14p. Order from OTS. 30 cents. NYO-5222

Decontamination of stainless steel, by D. O. Campbell. Oak Ridge National Lab., Oak Ridge Tenn. Mar 1955. Decl. Feb 22, 1957. Contract W-7405-Eng-26. 45p. Order from OTS. 40 cents. ORNL-1826 (Del.)

Activities in the $KCl-FeCl_2$ and $LiCl-FeCl_2$ systems, by C. Beusman. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 105p. Order from OTS. 55 cents. ORNL-2323

U. S. Atomic Energy Commission reports on elemental fluorine, compiled by Sidney F. Lanier. Technical Information Service Extension, Oak Ridge, Tenn. May 1957. 12p. Order from OTS. 15 cents. TID-3507

Study of the isomerization of C^{14}- labeled perinaphthene, by Masao Nakazaki. University of California, Radiation Lab., Berkeley, Calif. Mar 1957. Contract W-7405-Eng-48. 15p. Order from OTS. 20 cents. UCRL-3700

Calculation of the ThS-U and ThS-Ti phase diagrams, by Leo Brewer. University of California. Radiation Lab., Berkeley, Calif. June 1957. Contract W-7405-Eng-48. 4p. Order from OTS. 10 cents. UCRL-3805

Critical literature survey of tributyl phosphate as a uranium extractant, by W. B. Wright, Jr. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. Jan. 1952. Decl. Feb. 11, 1957. Contract W-7405-Eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. Y-838

Chemistry—Radiation and Radiochemistry

Study of the feasibility of aqueous recovery of spent fuels. Part 5. Instrumentation design data, by M. H. Wilsnes. Engr. Research Institute, Univ. of Michigan. Ann Arbor, Mich. July 1954. 47p. Order from OTS. 35 cents. AECU-3430

Effect of ionizing particles on liquid water and aqueous solutions, by Edwin J. Hart. Argonne National Lab., Lemont, Ill. Mar 1953. Decl. Feb. 23, 1957. Contract W-31-109-Eng-38. 18p. Order from OTS. 15 cents. ANL-4999

Examination of irradiated ThO_2 slugs for the U233/Th ratio, by R. P. Wischow. Oak Ridge National Lab., Tenn. June 1955. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-55-6-27

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Terminal report on the radiolanthanum laboratory. II. Analytical methods research and adaptation, by H. R. Schmidt and W. W. Marshall. Hanford Works, Richland, Wash. June 1950. Decl. Feb. 19, 1957. Contract W-31-109-Eng-52. 25p. Order from LC. Mi $2.70, ph $4.80. HW-18150

Pile-induced threshold reactions in stainless steel, by R. P. Schuman and A. C. Mewherter. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 14p. Order from OTS. 20 cents. KAPL-1779

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Radionuclides in reactor cooling water - identification, source and control, by D. W. Moeller. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 171p. Order from OTS. $ 1.00. ORNL-2311

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Radiation resistant lubricants--their development and status. Progress report for May 1, 1951 through June 30, 1954, by R. O. Bolt, J. G. Carroll, and J. R. Wright. California Research Corp., Richmond, Calif. June 1954. Decl. Feb. 26, 1957. Contract AT (11-1)-74. 68p. Order from OTS. 45 cents. TID-5186 (Del.)

Chemistry—Separation Processes for Plutonium and Uranium

Clinton Laboratories process manual. Section 7-A. Product purification wet D process, by W. E. Kirst. E. I. du Pont de Nemours and Co. TNX Div., Wilmington, Del. Sept 1943. Decl. Feb. 12, 1957. 34p. Order from LC. Mi $3.00, ph $6.30. A-3789 (Sec. 7-A)

Clinton Laboratories Process Manual. Section 8. Waste disposal -- wet B process, by W. E. Kirst. (1943). E. I. du Pont de Nemours and Co. TNX Div., Wilmington, Del. Decl. Feb. 12, 1957. 21p. Order from LC. Mi $2.70, ph $4.80. A-3789 (Sect. 8)

Modifications of the F process. Final report, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. 1952. Decl. June 12, 1956. Contract AT (11-1)-172. 58p. Order from OTS. 40 cents. AECD-3758

Aspects of large-scale production of U^{233}, by Leonard I. Katzin. Argonne National Lab., Lemont, Ill. Dec 1947. Decl. Feb. 13, 1957. Contract W-31-109-Eng-38. 46p. Order from LC. Mi $3.30, ph $7.80. ANL-4085

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Process for the recovery of U^{235} reactor fuel for Arco chemical areas, by C. E. Larson. Oak Ridge National Lab., Oak Ridge, Tenn. Feb. 1950. Decl. July 1, 1957. 9p. Order from OTS. 25 cents. CF-50-2-55

Review of the relative merits of packed columns, pulse columns, mixer-settler mechanisms, and centrifugal contactors, by A. C. Jealous and E. C. Stewart. Oak Ridge National Lab., Tenn. Jan 1951. Decl. Feb. 13, 1957. Contract W-7405-Eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-51-1-10

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Corrosion of type 347 stainless steel by 1st cycle raffinate, by A. R. Olsen. Oak Ridge National Lab., Tenn. Oct. 1951. Decl. Feb. 20, 1957. Contract W-7405-Eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-51-10-31

Test of the $Ca(OH)_2$ solvent recovery system on Purex first uranium cycle solvent, by P. A. Haas. Oak Ridge National Lab., Tenn. June 1953. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-53-6-110

Recommended pulse column dimensions and accessories for the Thorex Pilot Plant, by A. C. Jealous. Oak Ridge National Lab., Tenn. June 1953. Decl. Feb. 20, 1957. Contract W-7405-Eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-53-6-138

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Survey of separation processes for technetium, by N. A. Krohn. Oak Ridge National Lab., Tenn. July 1954. Decl. with deletions Feb. 14, 1957. Contract W-7405-Eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-54-7-196

Design criteria for the HRT chemical plant, by William L. Carter. Oak Ridge National Lab., Tenn. Nov 1954. Decl. Feb. 15, 1957. Contract W-7405-Eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-54-11-190

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Progress report on the adsorption extraction process for the two month period ending Dec. 1, 1943, by A. R. Brosi and E. R. Russell. Chicago Univ., Metallurgical Lab. Decl. Feb. 16, 1957. 19p. Order from LC. Mi $2.40, ph $3.30. CN-1227

Separations Development Division semimonthly report for period ending March 31, 1944, by O. H. Greager. Clinton Labs., Oak Ridge, Tenn. Decl. Feb. 18, 1957. 11p. Order from LC. Mi $2.40, ph $3.30. CN-1409

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Studies in the physical chemistry of precipitate formation: $BiFO_4$. Final report for period July 1, 1944 to January 1, 1945, on problem assignment No. 203-X72C. Part I, by A. R. Brosi. Clinton Labs., Oak Ridge, Tenn. June 1945. Decl. Feb. 16, 1957. Contract W-7405-Eng-39. 75p. Order from LC. Mi $4.50, ph $12.30. CN-2037

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Parian and Teflon in 1A Redox solutions, by W. W. Koenig. Hanford Works, Richland, Wash. May 1949. Decl. Feb. 19, 1957. Contract W-31-109-Eng-52. 3p. Order from LC. Mi $1.80, ph $1.80. HW-13282

Determination of total plutonium in the presence of aluminum, by R. E. Burns and G. B. Barton. Hanford Works, Richland, Wash. Feb. 1950. Decl. Feb. 19, 1957. Contract W-31-109-Eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-15944

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Solubility of tributyl phosphate in aqueous solutions, by Leland L. Burger and R. C. Forsman. Hanford Works, Richland, Wash. Apr. 1951. Decl. Mar. 2, 1957. Contract W-31-109-Eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-20936

Volatilization of ruthenium in nitric acid recovery, by Archie S. Wilson. General Electric Co. Hanford Atomic Products Operation, Richland, Wash. Sept. 1954. Decl. Feb. 25, 1957. Contract W-31-109-Eng-52. 3p. Order from LC. Mi $1.80, ph $1.80. HW-31300

Corrosion of metals and alloys in SIR and STR process streams, by R. H. Perkins and C. M. Slansky. American Cyanamid Co. Atomic Energy Div., Idaho Falls, Idaho. Mar. 1952. Decl. Feb. 23, 1957. Contract AT(10-1)-177. 147p. Order from LC. Mi $7.20, ph $22.80. IDO-14035

Status report on studies of uranium-aluminum alloy dissolution to a DIBAN dissolver product, by R. L. Andelin, F. H. Tingey, and C. M. Slansky. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. June 1957. Contract AT (10-1)-205. 26p. Order from OTS. 35 cents. IDO-14407

Purification of plutonium by a chromatographic method, by John A. Ayres. Iowa State College, Ames, Iowa. June 1949. Decl. Feb. 26, 1957. 123p. Order from LC. Mi $6.30, ph $19.80. ISC-49

Investigation of centrifugal extractors. Detailed project status report on Job 11. Kellex Corp., New York. Sept. 1949. Decl. Mar. 7, 1957. Contract AT-30-1-GEN-169. 50p. Order from LC. Mi $3.30, ph $7.80. KLX-59

Development of macro and micro analytical procedures for process solutions. Summary report covering period July 18, 1949 to Feb. 17, 1950. Kellex Corp., New York. Mar. 1950. Decl. Feb. 25, 1957. 13p. Order from LC. Mi $2.40, ph $3.30. KLX-1063

Homogeneous reactor processing progress report, period March 1-31, 1953. Job 57. Vitro Corp. of America, New York. Apr. 1953. Decl. Feb. 27, 1957. Contract AT(11-1)-217. 11p. Order from LC. Mi $2.40, ph $3.30. KLX-1613

Fission product separations study - Quarterly progress report - December 1, 1956 - February 28, 1957, by R. A. Keeler, C. J. Anderson, and M. Kibrick. Vitro Laboratories, Div. of Vitro Corp. of Amer., West Orange, N. J. Mar 1957. Contract W-7405-Eng-26. Vitro subcontract No. 994. 28p. Order from OTS. 35 cents. KLX-10066

Separations Chemistry Quarterly Progress Report - January-March 1954, by E. E. Motta, D. W. Bareis, and D. Cubicciotti, eds. North American Aviation, Inc., Downey, Calif. June 1954. Decl. Mar. 12, 1957. Contract AT-11-1-GEN-8. 23p. Order from LC. Mi $2.70, ph $4.80. NAA-SR-1015

Separations Chemistry Quarterly Progress Report - April-June 1954, by David W. Bareis, Daniel D. Cubicciotti, and E. E. Motta, eds. North American Aviation, Inc., Downey, Calif. Oct 1954. Decl. Mar. 2, 1957. Contract AT-11-1-GEN-8. 16p. Order from LC. Mi $2.40, ph $3.30. NAA-SR-1071

Problems of leaching and digestion of uraniferous slags and alloys. Progress Report No. 6 for Oct. 1951, Vitro Mfg. Co., Pittsburgh, Pa. July 1952. Decl. Nov. 13, 1956. Contract AT(30-1)-1241. 8p. Order from LC. Mi $1.80, ph $1.80. NYO-1140

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Erosion of aluminum, by E. H. Honeycutt, Jr. Savannah River Lab., E. I. du Pont de Nemours and Co., Augusta, Ga. May 1957. Contract AT(07-2)-1. 16p. Order from OTS. 20 cents. DP-214

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Development of Zircaloy-clad, discrete burnable poison elements for S3G/S4G, by G. F. McKittrick and W. A. Neisz. General Electric Co., Knolls Atomic Power Lab., Schenectady, N. Y. July 1957. Contract W-31-109-Eng-52. 27p. Order from OTS. 25 cents. KAPL-1726

Corrosion of aluminum in high temperature water II. Application of infrared spectra to corrosion studies, by R. M Haag. General Electric Co., Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1957. Contract W-31-109-Eng-52. 18p. Order from OTS. 20 cents. KAPL-1739

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KAPL-M-EEB-13 (Del.)

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Effect of sodium on the mechanical properties of zirconium, by J. C. Bokros. Atomics International. A division of North American Aviation, Inc. Canoga Park, Calif. June 1957. Contract AT (11-1)-Gen-8. 38p. Order from OTS. 30 cents. NAA-SR-1867

Germinative grain growth characteristics of zirconium, by J. C. Bokros. Atomics International. A division of North American Aviation, Inc. June 1957. Contract AT (11-1)-Gen-8. 25p. Order from OTS. 25 cents. NAA-SR-1926

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Quarterly process development progress report for January, February, and March 1953, by A. J. Stonehouse, comp. Brush Beryllium Co., Cleveland. May 1953. Decl. Feb. 28, 1957. Contract AT (30-1)-541. 29p. Order from LC. Mi $2.70, ph $4.80. NYO-1119

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NYO-3680

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Analysis of the biological shield of the Sodium Reactor Experiment, by A. R. Vernon. Atomics International. A Division of North American Aviation, Inc. Canoga Park, Calif. June 1957. Contract AT (04-3)-49. 26p. Order from OTS. 25 cents. NAA-SR-1949

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Physics division semiannual progress report for period ending March 10, 1957, by A. H. Snell, J. L. Fowler and E. O. Wollan. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 59p. Order from OTS. 40 cents. ORNL-2302

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Study of waste facilities, by H. W. Stivers. Hanford Atomic Products Operation, Richland, Wash. June 1956. Changed from Official Use Only Nov. 26, 1956. Contract W-31-109-Eng-52. 19p. Order from LC. Mi $2.70, ph $4.80. HW-37680

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Reactors—General

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Variation of diffusion length with sigma-pile size, by E. Z. Block and D. E. Davenport. Hanford Atomic Products Operation, Richland, Wash. Jan. 1954. Decl. Feb. 20, 1957. Contract W-31-109-Eng-52. 20p. Order from LC. Mi $2.40, ph $3.30. HW-30422

The SPERT-III reactor facility preliminary design report, by T. R. Wilson. Phillips Petroleum Co., Idaho Operations Office. Idaho Falls, Idaho. May 1957. Contract AT (10-1)-205. 27p. Order from OTS. 25 cents. IDO-16341

Nuclear calculations for SPERT III zirconium core, by G. A. Cazier and B. L. Hanson. Phillips Petroleum Co., Idaho Falls, Idaho. Oct. 1956. Contract AT (10-1)-205. 30p. Order from OTS. 25 cents. IDO-16359

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Design study of small boiling reactors for power and heat production, by M. Treshow. Argonne National Lab., Lemont, Ill. Nov. 1954. Decl. Mar. 6, 1957. Contract W-31-109-Eng-38. 63p. Order from OTS. 40 cents. ANL-5327 (Del.)

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Reactor Engineering Division Quarterly Report - Section I, January, February, March, 1956. Compiled by members of the Reactor Engineering Division. Argonne National Lab., Lemont, Ill. July 1956. Decl. Apr. 9, 1957. Contract W-31-109-Eng-38. 176p. Order from OTS. $1.10. ANL-5571

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Liquid metal fuel reactor experiment - quarterly progress report. November 1956 - February 1957. The Babcock & Wilcox Co. Alliance, Ohio. Contract AT (30-1)-1940 - B&W contract AEJ-46. 167p. Order from OTS. $ 1.00 BAW-1004

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Liquid metal fuel reactor experiment - the economic comparison of a large-scale LMFR breeder and burner. The Babcock and Wilcox Co., Alliance, Ohio. May 1957. Contract AT (30-1)-1940, and B&W No. AEJ-46. 17p. Order from OTS. 30 cents. BAW-1012

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